# DOTWise 3.5.2

**MicroStation, InRoads & ProjectWise for Survey, Design, Real Estate & Traffic Plans**

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State of Indiana
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# Contents

# 1. Welcome to INDOTWise 3.5

*A Message from CAD Support*

*Why did we make these changes/alterations?*

After our initial deployments of INDOTWise versions 1.0 and 2.0, CAD Support has focused the last two years on the switch to InRoads from MX Roads. Due to the scope of these changes, this document is intended to roll up all the enhancements to the CAD Workspace, ProjectWise and InRoads suites into a single document.

Since the initial releases of INDOTWise 1.0 and the 2.0 update, we've completely jumped through 3 minor releases of both MicroStation and InRoads, along with 3 versions of ProjectWise. While this document won't show every new item, we will hit on the major productivity enhancements. Please keep in mind that this document is not a replacement for Fundamentals training on each of these products, and can be supplemented with the use of each products online Help file.

We want to impart to you *why* things are, as much as *how* certain tools work or what buttons to click to perform a particular operation.

The focus of this document is to answer the question, "What has changed in CAD and where can I find all the needed information to take advantage of those changes?" The answer is simple: Right Here in this document. Note that the focus is on the how these tools work and a rough guideline on how they should look. As always, Users should consult the current Indiana Design Manual for requirements related to the content and presentation of INDOT plans.

If for any reason, you believe that the information provided in this document is not accurate or clearly explained-please do not hesitate to let us know. We will make every effort to make it right.

Thanks,

Scott Robison
Jason Kuhn

## 2. INDOTWise 3.5.2

### 2.1 Requesting ProjectWise Access via ITAP (INDOT Technical Application Pathway)

#### 2.1-1 Access to your Applications

You can access ITAP via the INDOT Intranet at http://intranet.indot.state.in.us/. Then selecting the ITAP link to the right of the page as shown below will take you into the interface.
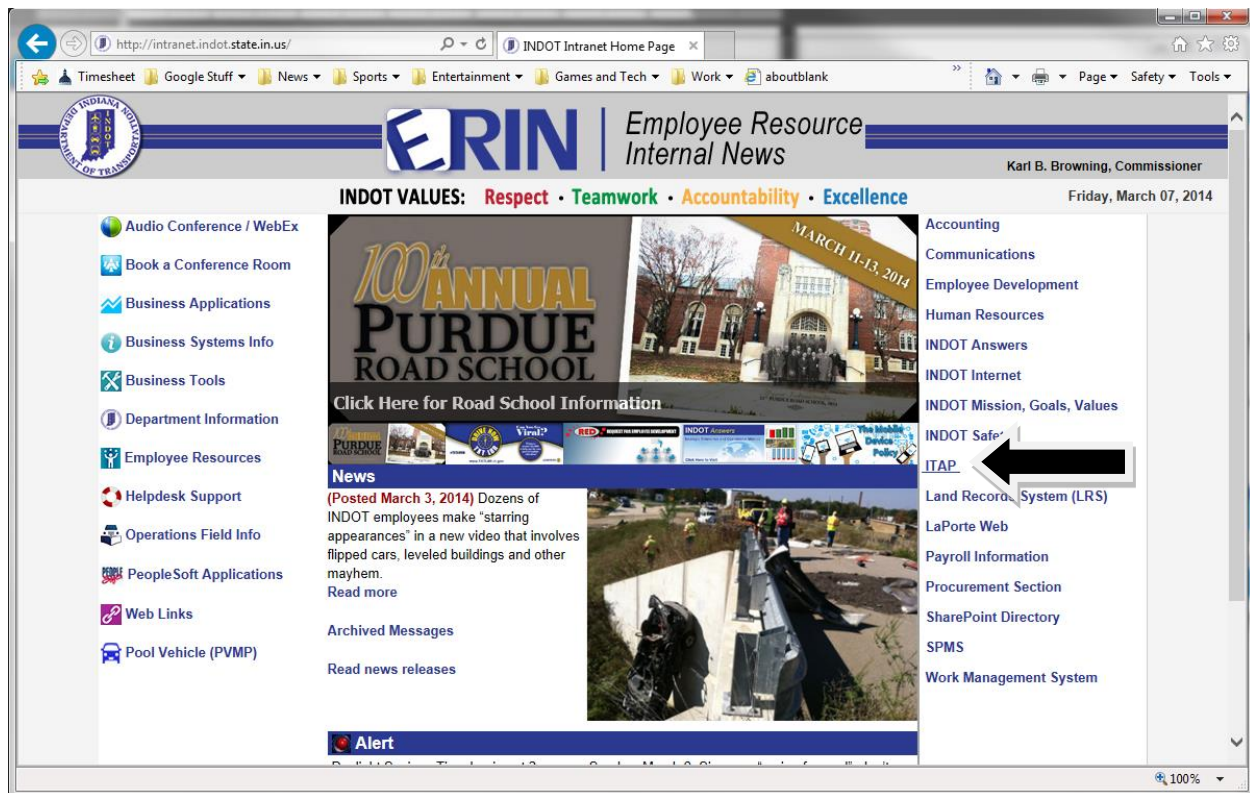


#### 2.1-2 ITAP Overview:

- The Home Main Page provides a list of a user's approved applications with application details, a link to request access to additional INDOT applications and a link to request additional roles for some applications. (Click Help icon at top left of page for additional instructions)
- If you had never previously logged in to ITAP you will be asked to login to via the ITAP Login screen and enter a valid **User Name** and **Password** and click on the **Login** button. (same login and password and used to login to your computer)
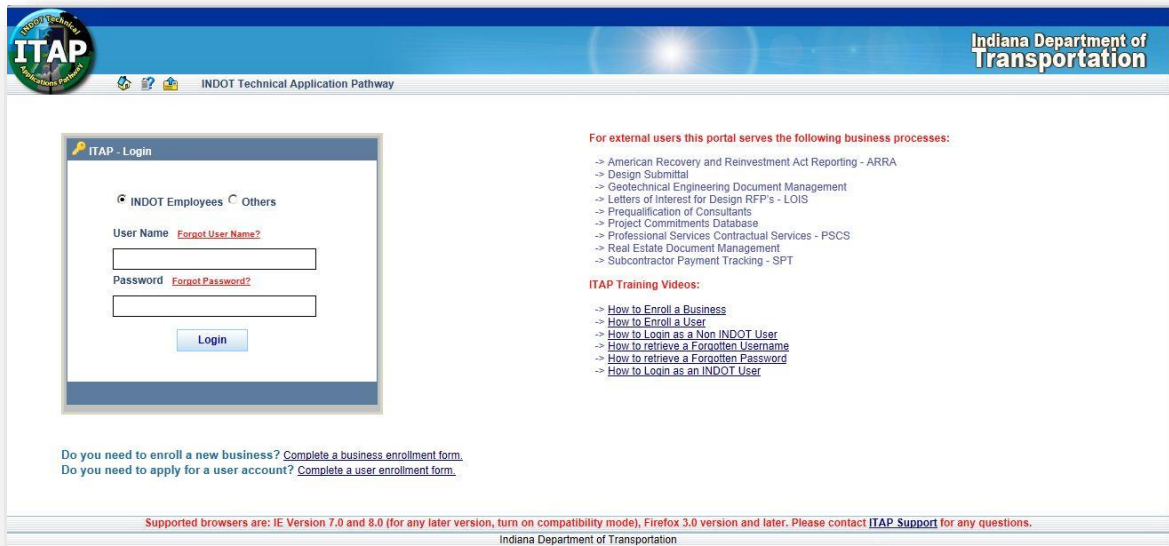
- If you have already used ITAP in the past and enrolled or logged in for access to other applications they will shown on your main page when you click the ITAP link. It should look very similar to this screen.
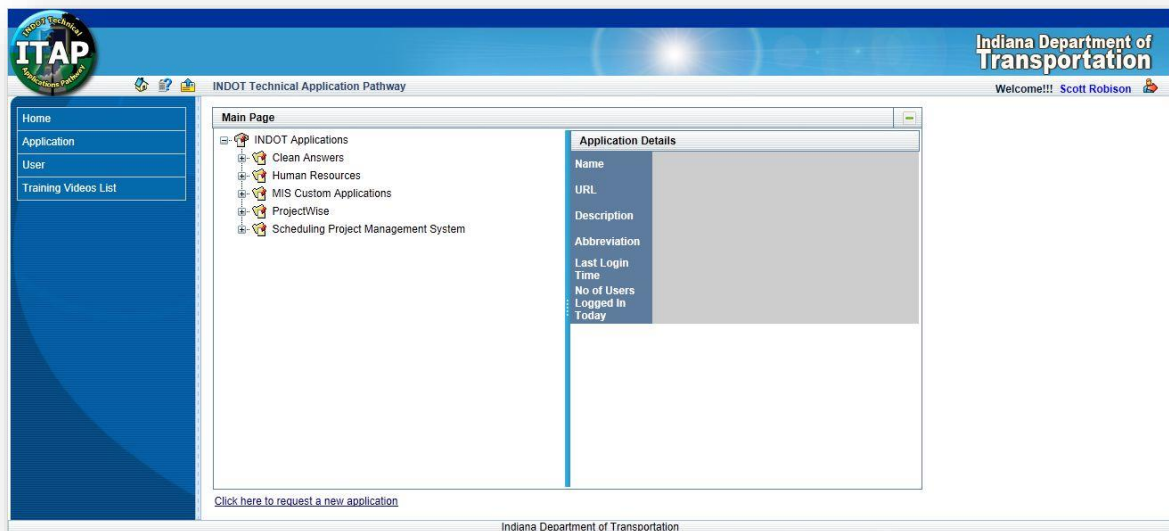


### 2.1-3   Request a new ProjectWise Account

To request access to ProjectWise and select a Role or Group you will start out by going to the following location:

- Select Application-Request New Application



- Select ProjectWise-DOTWise
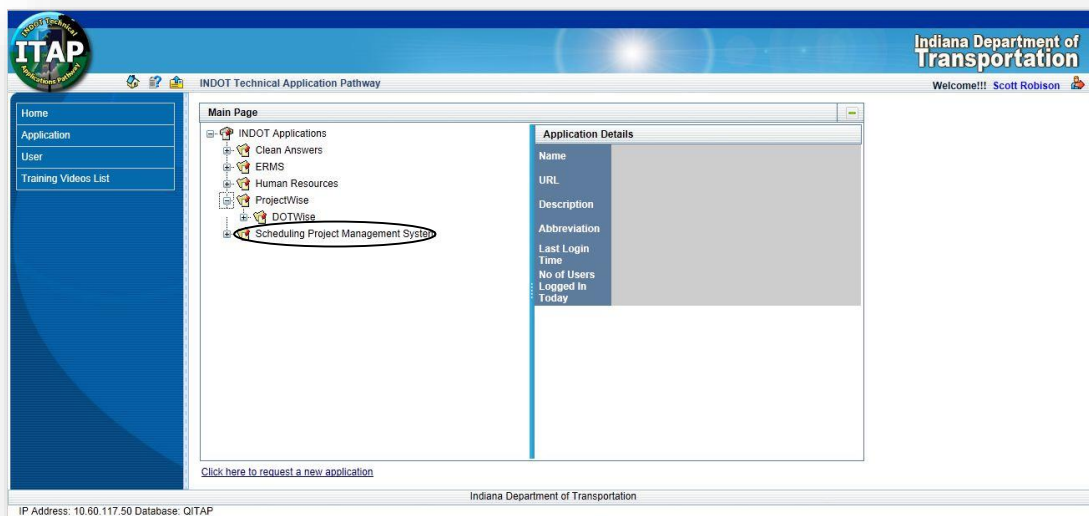


Upon selecting DOTWise the link for the application and a link to request additional roles will appear to the left as shown:
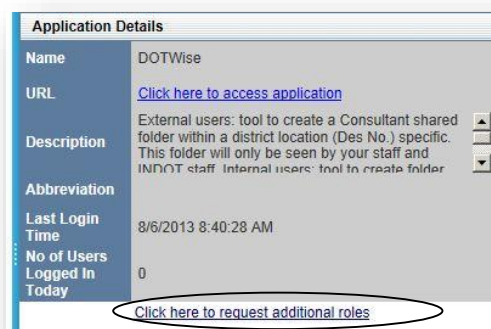
You will then be given the option to pick a Role/Group to which you will request access to. It will appear in the bottom right corner and has multiple pages of roles. Be sure to click next if your group is not listed on the first page.



- You will select the group or groups to which you belong and Click on the Submit button to submit the request or click Cancel to return the Main Page panel.
- An email request will be sent to your supervisor for approval. Once he/she approves the request an email will be sent to CAD support (CAD Support will then create an account for you in ProjectWise and may also contact you to see that you have the software installed on your machine). *You will get a notification email back once you have been approved access.*

If the **Submit** was successful the **Message** below displays, click on the **OK** button. Once the request is approved or denied an email will be sent to the users email.

If a previously submitted request has not been approved or denied the **Message** below displays, click on the **OK** button.



### 2.1-4   Request Additional Roles

To request an additional role(s) for one of your approved applications, once again click on the link, "Click here to request additional roles" in the Application Details panel to display the View/Edit Roles panel.  You may be changing groups or need access temporarily to work on a project.  This will require the same approval process as when initial enrollment occurs.

In the View/Edit Roles panel, to request a Role, click on the Checkbox under Select next to the Role name. A checkmark that is grayed out indicates that particular role is already assigned.

 **Click on the** Submit **button to submit the request or click** Cancel **to return the** Main Page **panel.**
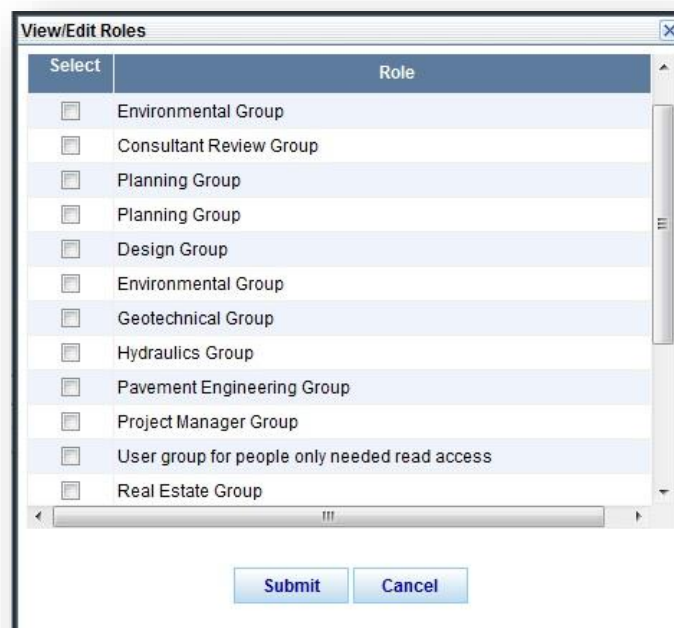
### 2.1-5   Changes to the Account Request Process

For those of you familiar with the original ITAP enrollment process for both Account Request and DOTWise, you'll see that we've now streamlined the process to only use a single ITAP application of DOTWise.   This initial enrollment will cover both your ProjectWise account request and the DOTWise application in a single process.  The ITAP staff will be migrating existing accounts over to this new application with their roles intact.

For additional information on the DOTWise Project Creator, please see Section 2.4 DOTWise Project Creator.

## 2.2      ProjectWise Folder Structure

### 2.2-1   Overview:

To maintain standardization, avoid duplication, and provide a better workflow, a Location: Designation Number (abbreviation Des. No. will be used throughout remainder of document) based project structure would best suit INDOT's workflow.  As shown in the image below, when Documents is expanded, there will be a listing of all the District locations, as well as other folders that will be discussed later.
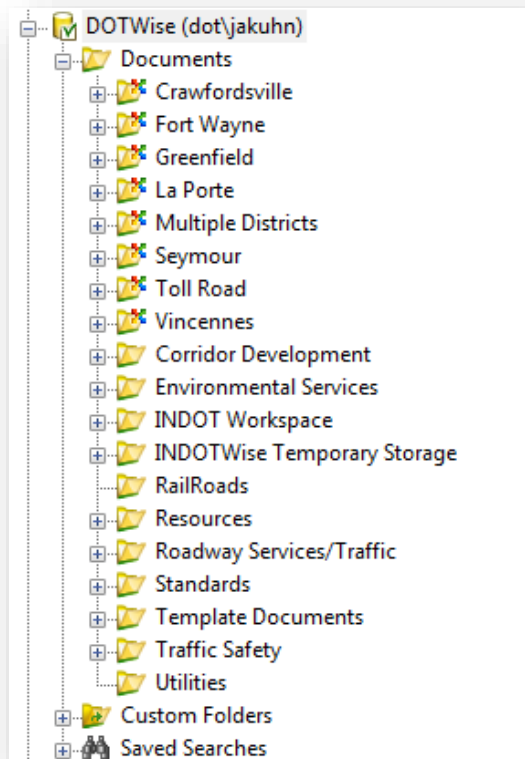


The DOTWise Root Folder Structure

### 2.2-2 Project folders:

Expanding any district folder will display a list of any Des. No. that has been requested under that location. The route number and/or description will be displayed in the description field.
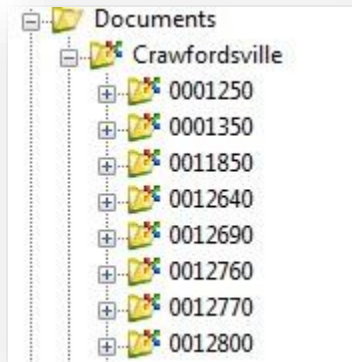


### District w/Des. No.

Each group/discipline will have their folder structure directly under the District\Des. No. These structures are created as needed via the DOTWise Project Creator.

In the following illustration, a Project containing all currently included disciplines is shown. Depending on what stage of the project workflow you're currently in, it's possible that very few of these folders will exist at this time, and will be added later in the project development process.
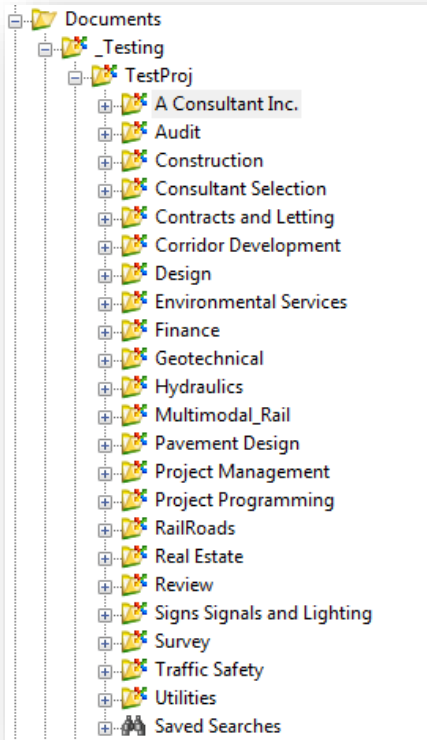
Project w/Disciplines

### 2.2-3    Other folders (Non-District Folders):

*Corridor Development –* This group's data is stored in this location prior to being associated to a Des. No.  A corridor development folder also exists under a Lead Des. No when the data is associated to a project.

*Environmental Services –* In addition to the Environmental Services group folder under the Location: Des. No., there is also this folder which will contain all Non-Des. No. projects that is exclusive to Environmental Services.

*INDOT Workspace –* Location of the new Managed Workspace files that used to be located on the X: drive, this also includes the location of InRoads resource files such as the XIN, Drafting Notes, and cell libraries.  Unless specifically directed, resources from this folder should not be used.

*INDOT Temporary Storage –* Data in the folder has been imported into ProjectWise, but has not yet been moved to the appropriate project location.  This folder is not visible unless your discipline has data within it.

*RailRoads –* Location of in-process RailRoad files to be shared with amongst group prior to placing in the Des No. project related folder.

*Resources* – This folder takes the place of the previous Common folder.  All groups will have their own folder for documents which pertain to their groups operation.  The CAD Support group has also created a Design Information folder containing informational documents (formerly DSInfo).

*Roadway Services/Traffic* – This folder contains Roadway Services/Traffic data that does not apply to a Des. No.

*Standards* – The Standards group folder is directly under the Documents folder due to their differing workflow.

*Template Documents* – Contains INDOT specific document templates and seed files.  These are used throughout the document creation process as needed.  Specific procedures for using these documents can be found throughout this book.

*Traffic Safety* – This group's data is stored in this location prior to being associated to a Des. No.  A Corridor Development folder also exists under a Lead Des. No. when the data is associated to a project.

*Utilities* – Location of in-process Utility files to be shared with amongst group prior to placing in the Des. No. project related folder.
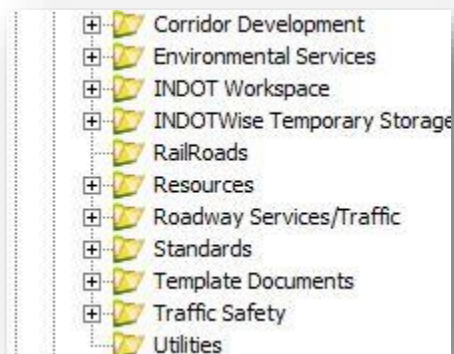


## 2.3     ProjectWise Security Overview

### 2.3-1   Overview:

The DOTWise ProjectWise Datasource adheres to a strict security model, providing inner discipline security, while providing all INDOT users the ability to review other data as necessary.  In addition to these security features, there are additional settings that are used administratively in order to provide rapid support and file restorations, should the need arise.  These settings are as follows:

1. Projects will be created by the DOTWise Project Creator.
2. Users will not have folder delete privileges; this will aid in CAD Support's and IOT's ability to process restores in a timely fashion.
3. Document delete privileges will be assigned at management discretion.
4. Users will no longer be able to adjust the security settings of template folders/projects created by the DOTWise Project Creator.

5. District and central office now share a common security group.  Data access and rights are based on need and positional responsibilities.

There is no longer a distinction between central office and district users.  For example, instead of a central office Environmental Services group, and a separate group in each district, all Environmental Service users have the same rights across all locations and projects.  This is to increase collaboration between locations with a minimal need for security adjustment.

### 2.3-2    Consultant Access

At this time, DOTWise access has been made available to the INDOT consultant community via ITAP (Section 2.1).  Throughout the project lifecycle, it will be quite possible that at the root of the Des. No. to see folders named after various consultant firms.  A project containing a consultant folder would look like the following:
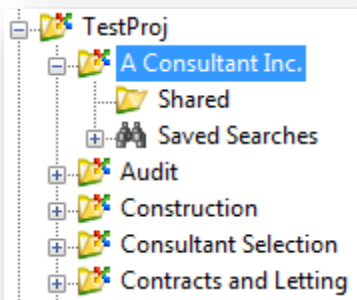


### Des. No. with Consultant Folder

Any instance where a consultant is placing data into our datasource the following conditions will apply:

1. The folder will be named with the consultants' name.
2. The consultant will only be able to see the data placed in their folder or the Shared sub-folder.
3. All INDOT Users will be able to see all consultant data.
4. The shared folder is provided for all INDOT users to place data they need to share back to the consultant (copies are recommended).  Only the intended consultant will see this data.

## 2.4  DOTWise Project Creator

### 2.4-1  Requesting Application Access via ITAP

The Home Main Page provides a link to request access to additional INDOT applications.
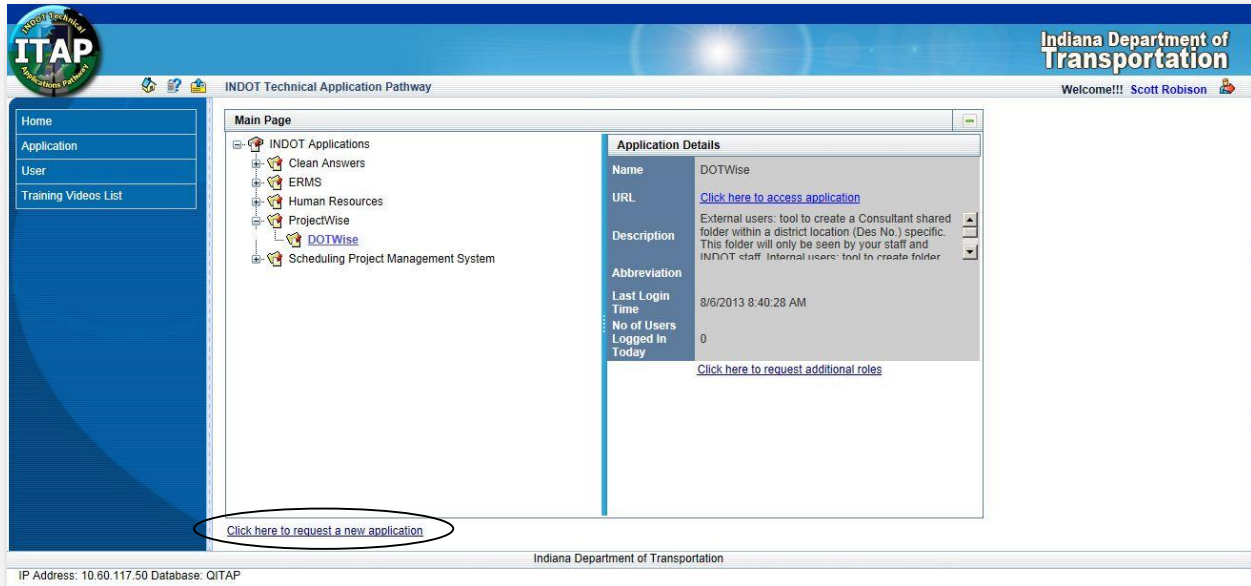


Click on the link for Request New Application Instructions

Selecting Request New Application from the ITAP Menu or the link "Click here to request access to new application" from the ITAP Home Page will display the Application Enrollment panel.
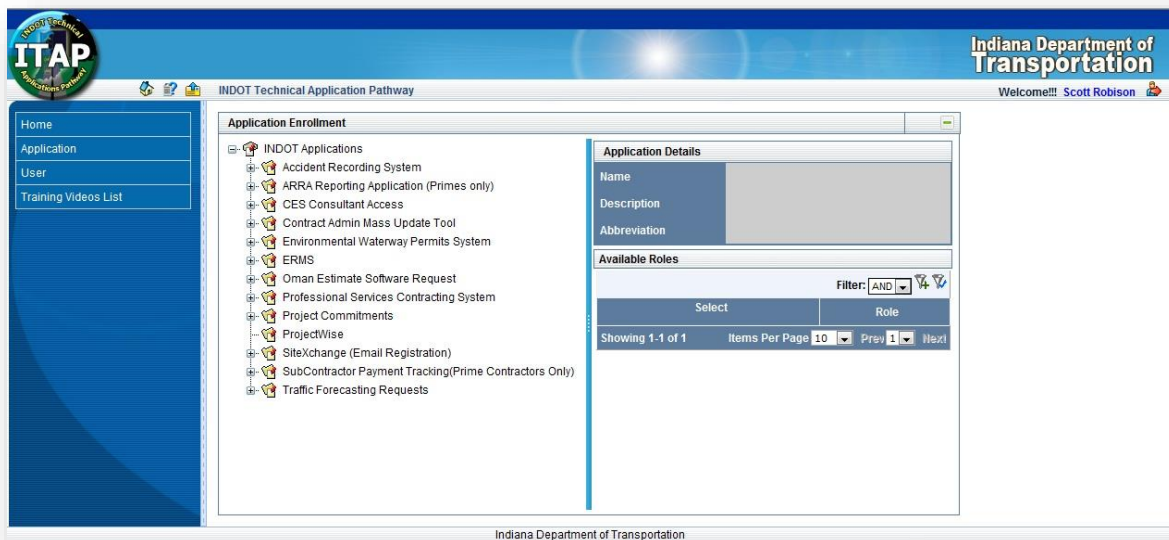
In the Application Enrollment panel, select one of the INDOT Applications from the left side of the panel. Select ProjectWise-DOTWise then the Submit button.
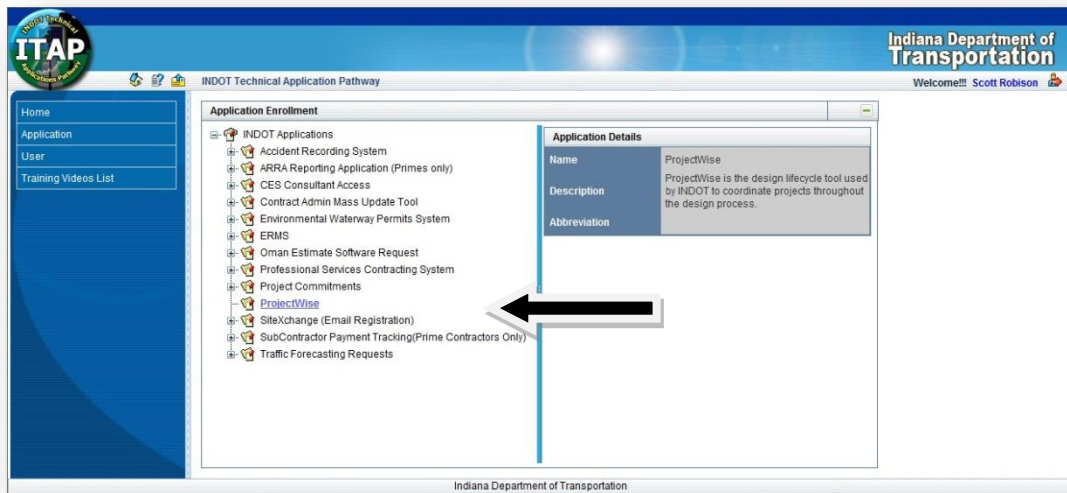


- An email request will be sent to your supervisor for approval. Once he/she approves the request an email will be sent to CAD support granting access to the Project Creator Web Interface.



Upon approval- You will have an active link under ProjectWise/DOTWise as shown below:
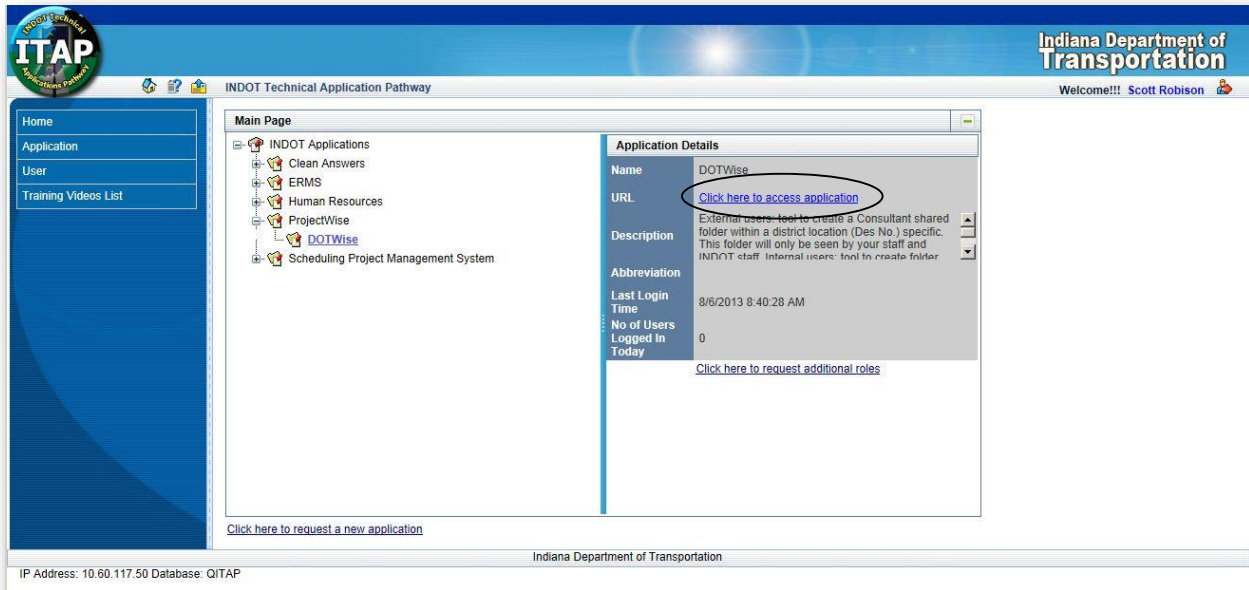
If you have additional questions about roles please refer back to 2.1-2 and 2.1-3 or

*To access Online Help click on the Icon* [icon] *at the top of the screen.*

*To contact ITAP Support click on the* [icon] *icon at the top of the screen.*

A new window will open with the Project Creator interface when the link is selected.  This will be covered in the next section.

### 2.4-2    Using the DOTWise Project Creator

*The DOTWise Project Creator tool allows internal and external users the ability to create ProjectWise projects without modifying the underlying security model.  Depending on the roles/groups you have requested and granted access to, you will be taken to one of three interfaces.*

The DOTWise Project Creator interface (Choose Project Type) will look as show below and will only show for anyone that is in the Corridor Development or Traffic Safety group and any additional group (i.e. Design or Survey).  This allows for you to choose to create a Des No. or Non Des project.
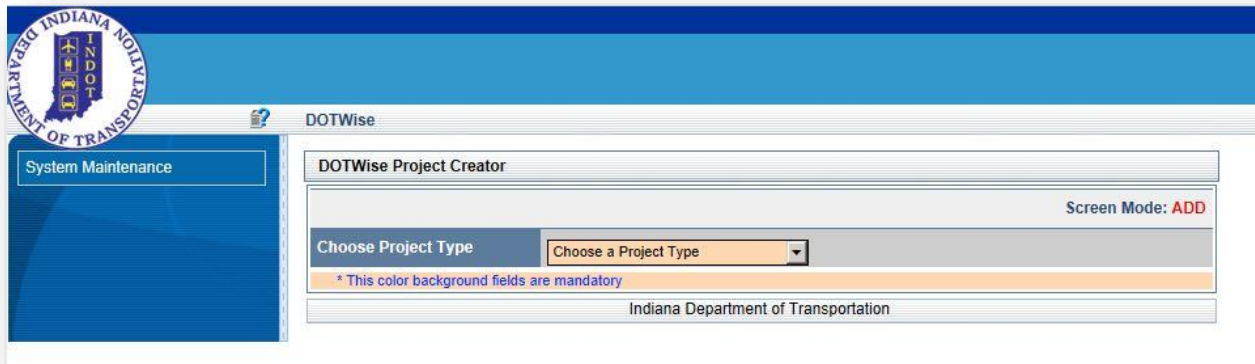
- By selecting the Project Type from the pull down you will be taken to one of the other two interfaces (Des Number Project or Non Des Project)
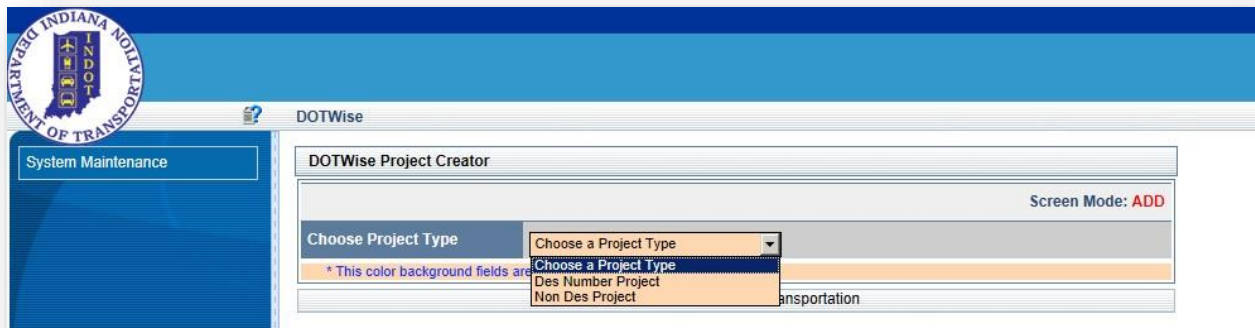


The DOTWise Project Creator interface (Des Number Project) will look as show below and is for all Disciplines other than Traffic Safety and Corridor Development (i.e. Design, Survey, Geotechnical, Hydraulics). This interface allows for the creation of projects that do have a Des No. in SPMS however this functionality is currently only enabled for the Traffic Safety and Corridor Development groups.

- To create a ProjectWise project, enter a Des Number for the project and click the **Validate Des Number** button.
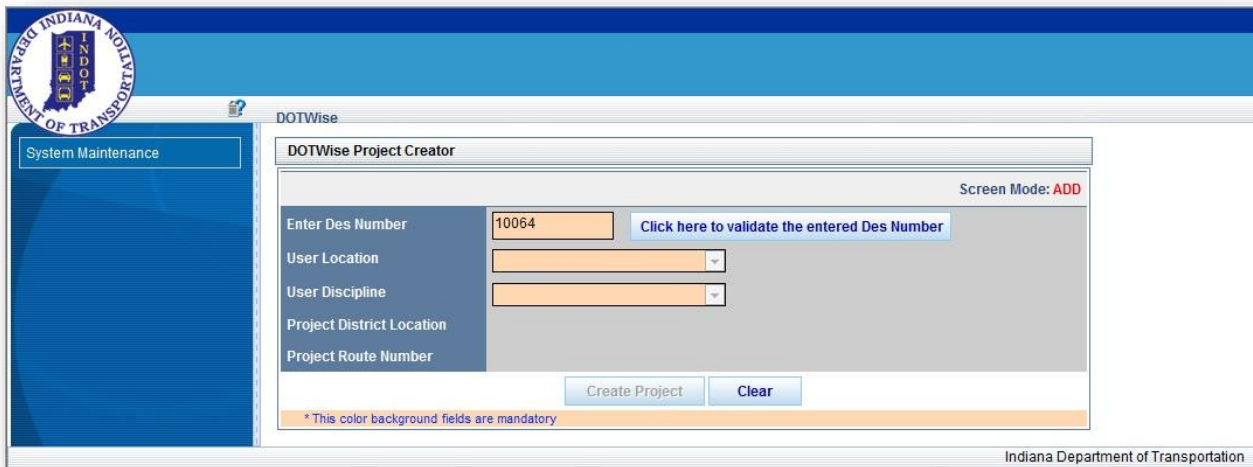
The application will check to see if the Des Number is a valid Des Number or not. If the Des Number entered is not a valid Des Number, a message will be displayed stating that the Des Number entered is not valid
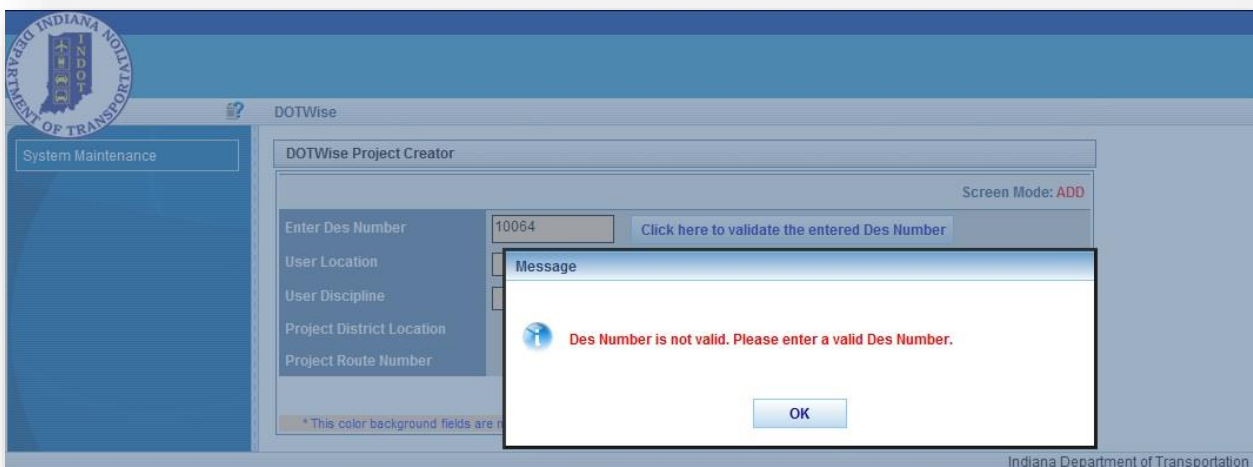


- Clicking the OK button will allow you to change the Des Number to a valid Des Number.

If a valid Des Number is entered, a message will be displayed stating that the Des Number is valid.
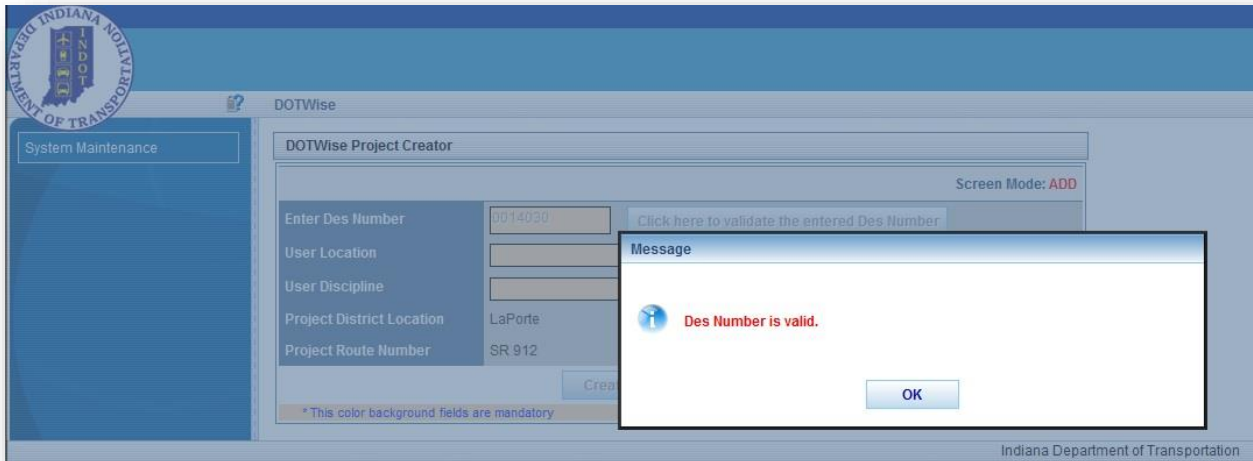
- Click the OK button and you will see that the Project District Location and Project Route Number values are displayed on the form.

You will also notice that the User Location dropdown list is enabled. You will also see that the Create Project button is enabled.
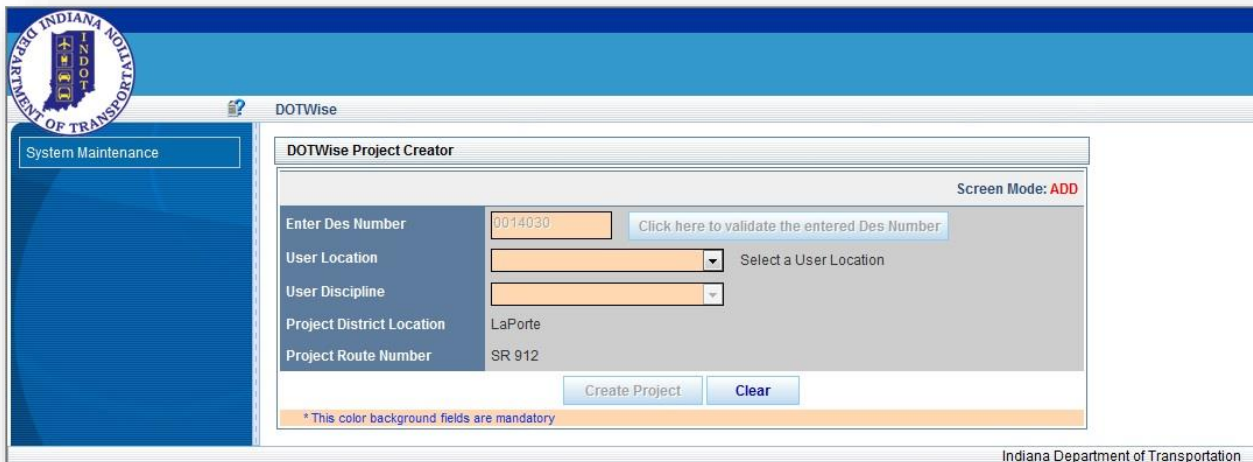


- Select a User Location from the User Location dropdown list.  (Be sure to select the location where you physically reside and not where the project is being built)  This will ensure the files are stored locally to where you are working).  The Project District location is defined by data from SPMS.

The User Discipline dropdown list will then become enabled.

- Select the User Discipline in which you are working.



If Environmental Services is selected, a User Sub Discipline dropdown list will become visible. In this case you will need to select a User Sub Discipline. If a User Discipline other than Environmental Services is selected, the User Sub Discipline dropdown list will not be visible and you are ready to create the project.

- To create the project, click the Create Project button.

*A confirmation message will appear showing that the project is in the process of being created. You will also see the project information.  There may be a small delay (1-2 minutes) before project shows in ProjectWise.*



- Click the OK button to start a new project from the beginning.

The DOTWise Project Creator interface (Non Des Project) will look as show below and is for anyone that is in the Corridor Development or Traffic Safety group.  This interface allows for the creation of projects that do not have a Des No.

- To create a Corridor Development or Traffic Safety ProjectWise project, enter the Project ID in the first field and select the User Discipline from the pull down as shown below.



- Once completed filling in the information, select the Create Project button



- The Reset button will take you back to the Start and allow you to begin the process all over again.

## 2.5    Auto-Logins for Integrated Applications

### 2.5-1    Overview:

New to V8i ProjectWise is the ability to have integrated applications such as MicroStation or Microsoft Office automatically login to ProjectWise with your user credentials. In prior versions, when attempting to use one of these applications from the desktop, you would be prompted for your login information prior to being able to communicate with ProjectWise. This new feature removes that step and allows you direct access without being prompted.

### 2.5-2  Enabling Auto-Login

To enable this feature:

1. In ProjectWise Explorer, go to the "*Tools > Network Configuration Settings...*" option.  This will present you with the network settings for your ProjectWise Client.
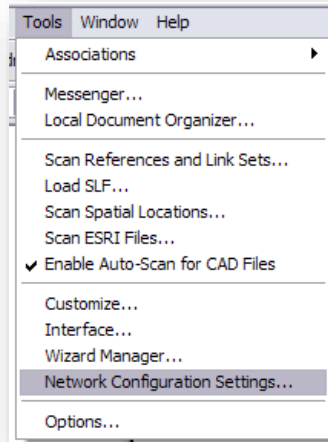


Network Configuration Settings

2. On the displayed panel, we're concerned with the 4th tab, *iDesktop Auto-Login*.  This panel shows all the integrated applications that ProjectWise has found on your machine.
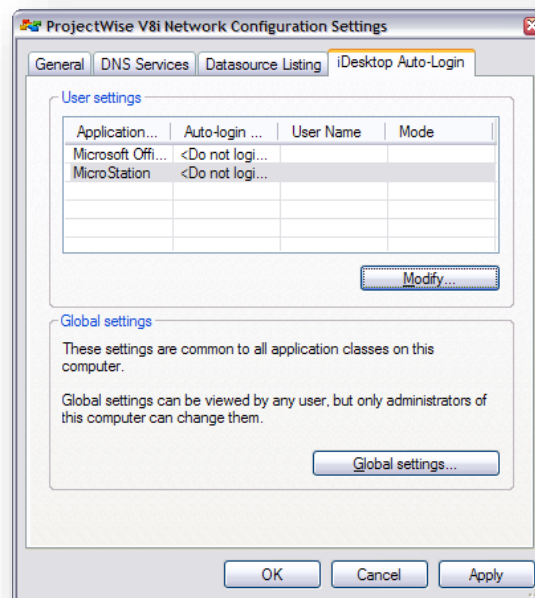


IDesktop Auto-Login

3. To enable the automatic login to your Datasource, you will need to adjust the following.  First, highlight the application you wish to have auto-login. Then select the Modify button.  This will present the following dialog.
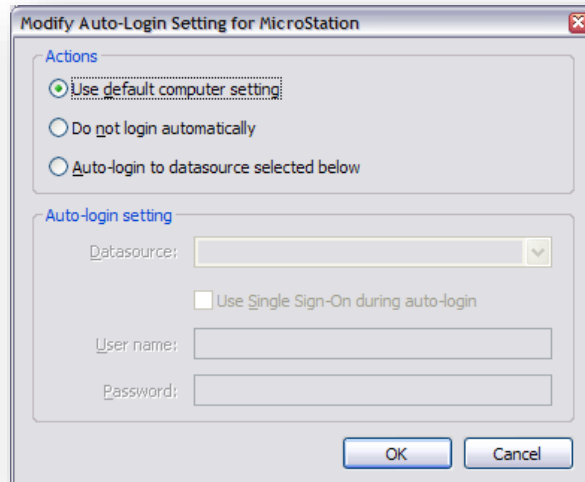
**Application Auto-Login Settings**

4. At this time, you will want to adjust your settings as shown.  These settings will cause your client to automatically login your application to the DOTWise datasource with your user credentials.
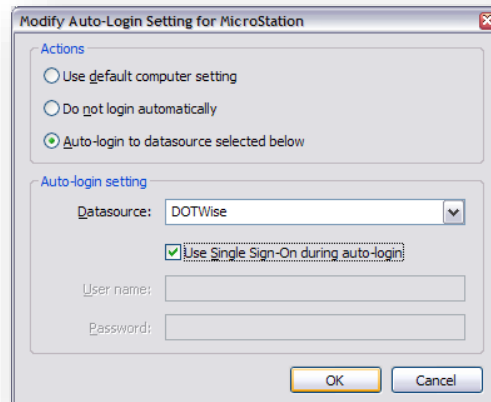
**Enabling Single Sign On**

5. Finally, select OK and repeat these steps are necessary to configure auto-login for any additional applications.  When completed, you're dialog will look similar to the following:
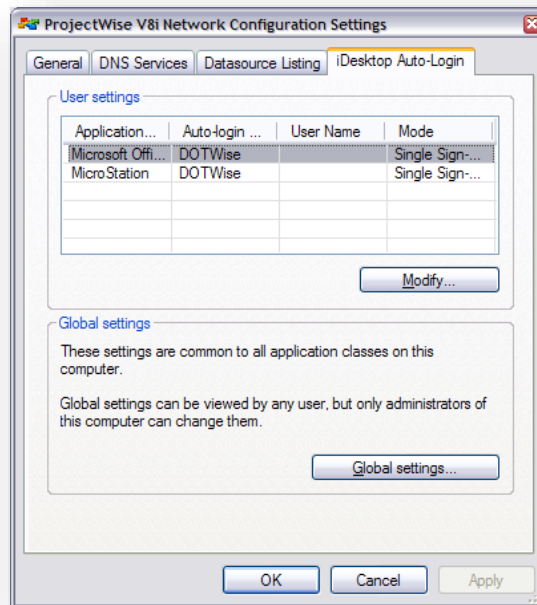


Auto-Logins Enabled

6. When completed, select OK and close any remaining windows for the Network Configuration settings.

## 2.6     Productivity Enhancements

### 2.6-1    Utilization of the Data Warehouse (Project Properties and Environments)

The Data Warehouse is INDOTs internal data repository with the vast majority of Project related information provided by the many systems within the agency.  Several departments within MIS at INDOT (GIS, CAD, and SPMS) have worked as a team to ensure that the information provided within the Data Warehouse is correct and updated in a timely manner.  By bringing all the data these systems provide together, ProjectWise can use this data in a variety of ways in both the CAD environment (populate Title Sheets) and also within ProjectWise interface (project properties).

As a major enhancement to the available functionality within DOTWise, we're now providing metadata fields for all major disciplines that are part of the project development process.  At this time, all projects will have at least a Des. No. and archival field at the Project level and the Des. No. field at the document level.  These placeholders have been put in place to allow the ability to add metadata to existing documents as the datasource functionality evolves over time.

### 2.6-2    Changes to the workflow

- *Separate Environments:*  There are now specific Environments for each area of a project.  As described below, this allows us to streamline the data available to each work group.

- *Documents Properties to populate sheet models:* One of the major changes in Version 2.0 of the INDOTWise workspace was the shift from populating sheet models with project properties to using document properties to perform this function. The major factor in this change is the fact that it allows users to utilize searches based on document attributes. This functionality has not changed for this release.
- *Similar Interfaces:* Through the use of environments, we were able to minimize the number of interfaces available while still providing the customization needed between different work groups.

### 2.6-3   Workflows and States

One of the major new architectural enhancements to the DOTWise datasource will be the eventual ability to archive and directly send documents from ProjectWise to the ERMS system in use by INDOT. To facilitate this functionality, all disciplines now have workflow and states available which can be used as document flags when specific milestones have been met and documents need sent to ERMS.

As this is an evolving process, each workflow only contains an initial, interim and archival state as shown:
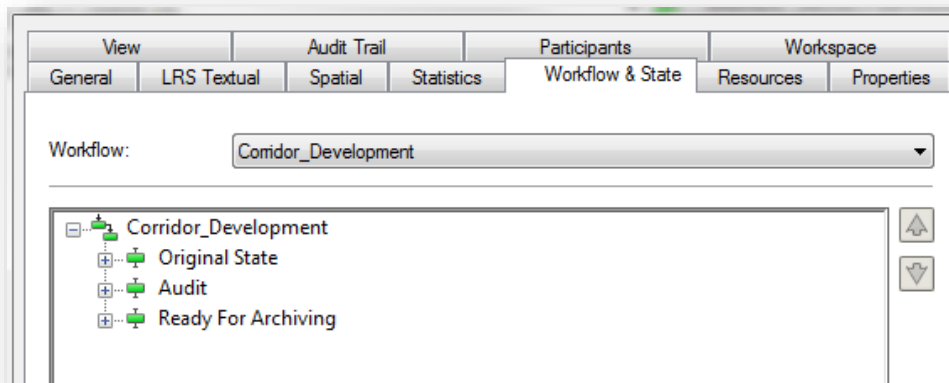


Default States for Each Workflow

## 2.7      Project Properties

### 2.7-1   Overview:

As discussed previously, projects will be created via the DOTWise Project Creator. After the project is created, project properties will be editable by the person(s) responsible for the project. There are a few variables that are populated using the data warehouse in the project properties. Others will need to be populated by the responsible parties.

*All items populated using the Data Warehouse are driven by the Designation Number. If the Designation Number changes, all information will change along with it.*
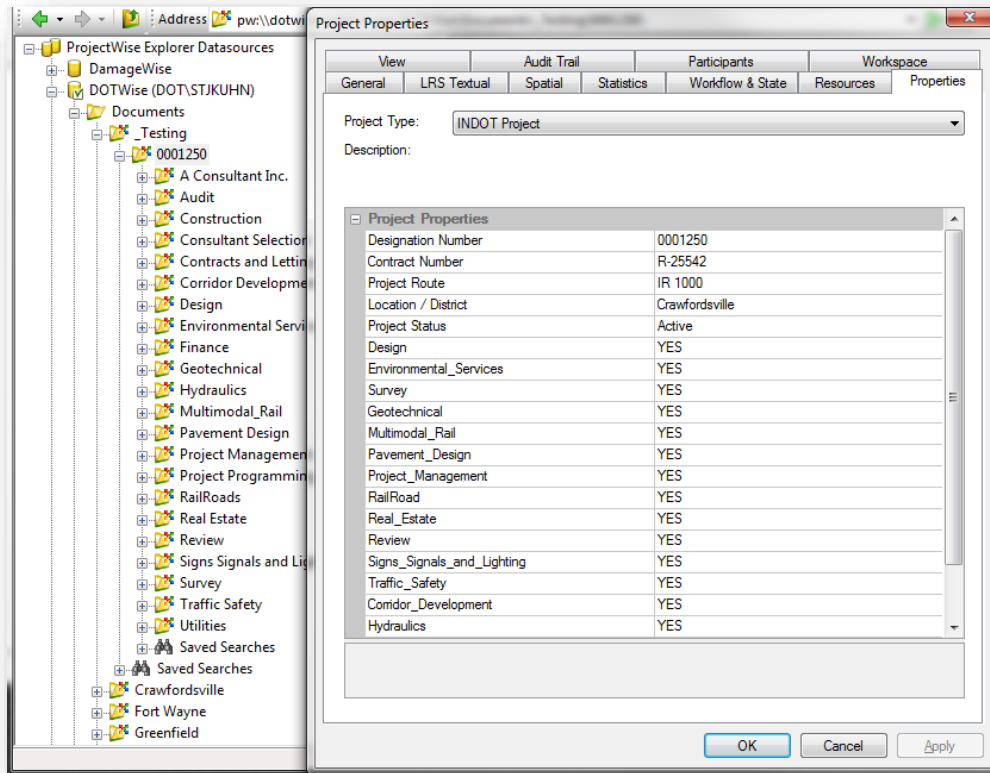
INDOT Project Properties

*Contract Number, Survey Book, Project Number and Bridge File information is still populated in INDOT border sheets using Project Information. Please make sure that this information is populated in the "Design" Project Properties dialog box.*

*At the time of the writing of this manual, the functionality to populate some of the above described Project Properties does not exist and they will have to be keyed into the Project Properties dialog box.*

To access the Project Properties dialog box, highlight your project by left mouse clicking on your project in the datasource tree in ProjectWise explorer. Then in the ProjectWise Explorer toolbar, click *Folder > Properties*.
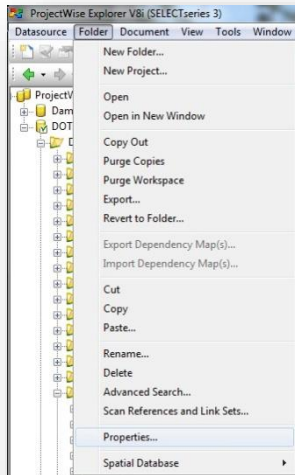
**Folder Properties Menu Item**

The *Project Properties* dialog box can also be accessed by right clicking on the project in the datasource tree.
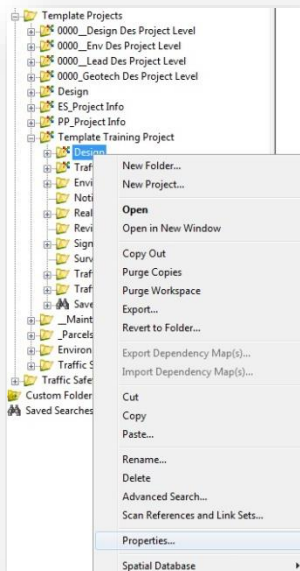


**Folder Properties Rt. Click Menu**

To simply view your current project properties, left click on your project in the datasource tree. Your Project Properties will be displayed in the Properties window located in the bottom right portion of the ProjectWise Explorer.
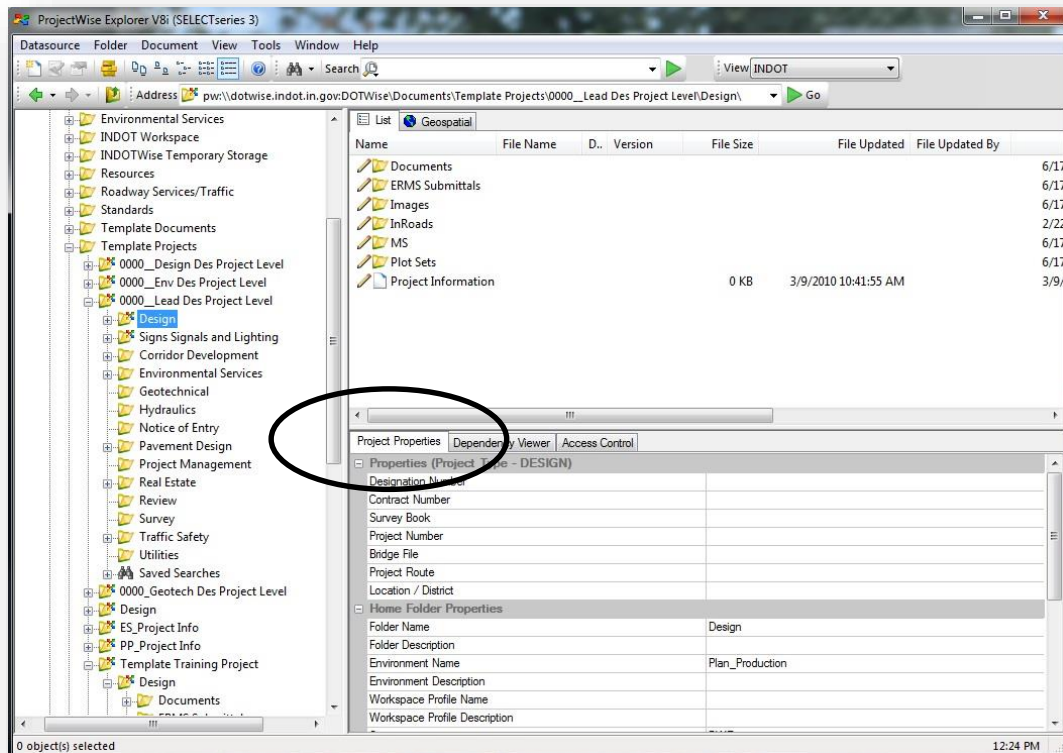


Project Properties Tab

For a complete description of the Project Properties dialog box, and the various tabs contained within, please see the sections titled "Folder Properties" and "Project Properties" in your Bentley Institute, *ProjectWise V8i (Select Series 4) User Essentials* manual or under the *Help>Contents* menu in ProjectWise.

### 2.7-2   Modifying Custom Properties

You can add or edit the custom project properties at any time via the *Properties tab* on the *Project Properties* dialog box.
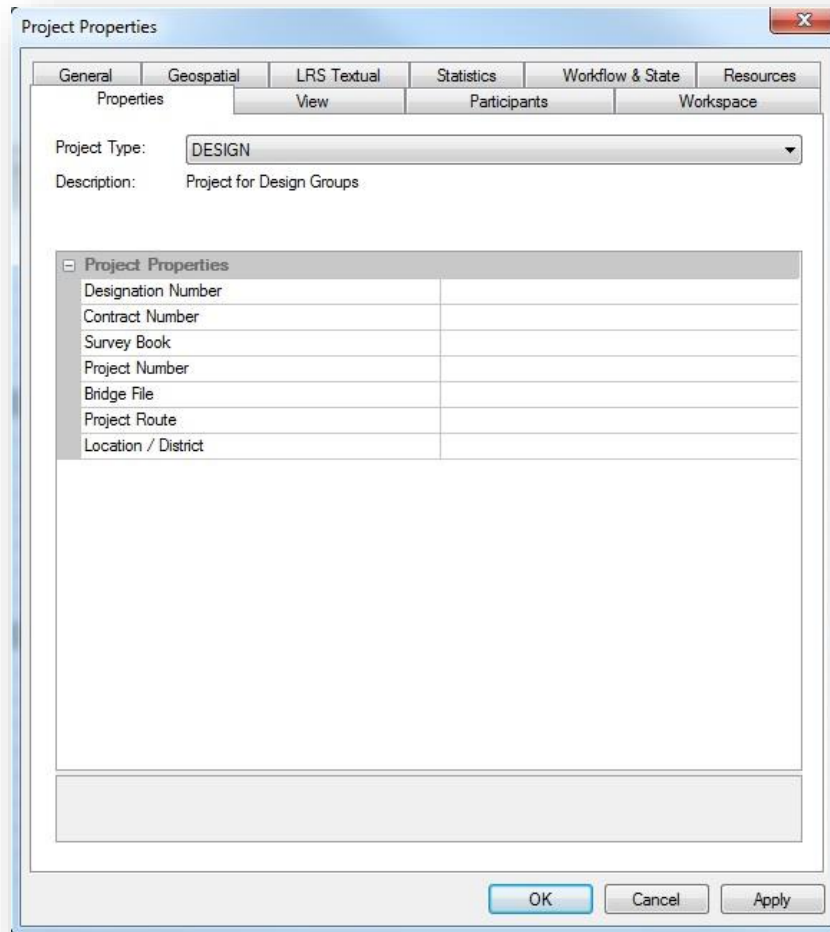
Project Properties

Any of the items under this tab, including the Project Type can be edited by either entering text or in certain cases, by using the pre-populated pull down menu.

You will notice that within the project properties, there are 4 different instances of Project Number. The first instance (shown in the figure above) populates the border sheet of every document in the project (formerly populated using the Tinfo – Sheet Population Tool). The next three populate the middle portion of the title sheet. Due to the way ProjectWise performs it was not possible to use only one instance within the project properties to populate both the border sheets and the Title Sheet.

## 2.8 Creating New Documents

The creation of new documents is covered in the Bentley Institute Course Guide via BLN Titled *ProjectWise V8i (Select Series 4) User Essentials.*

### 2.8-1 Creating Documents from ProjectWise Seed Files

When creating a new document within the INDOT Workspace, the user will need to know a few items:

- The location of the Template Documents (Documents\Template Documents\Seed).

- The type of document creation wizard (Advanced or No).
- The location where the file needs to go.

*Note:* *These steps apply for any document created from a pre-existing file in the ProjectWise datasource, including those for MicroStation, Office or otherwise.*
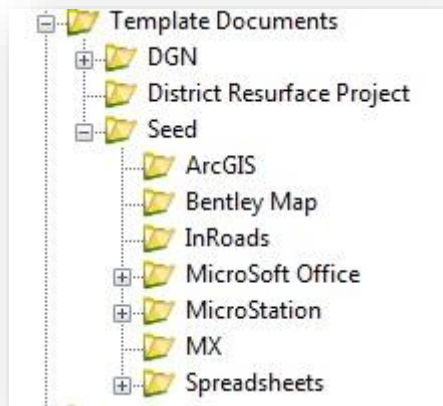


**Template Documents**

With the template documents located, we need to start the document creation process.  With the folder you'd like to create the document in, either Rt. Click in the document panel and select New -> Document, or access this from the Document window.  If you've previously defined a wizard, you may be shown a blank document panel; for this example however, the assumption will be made that no default wizard has been set.  Upon starting the New -> Document command, you will be prompted with the following dialog:
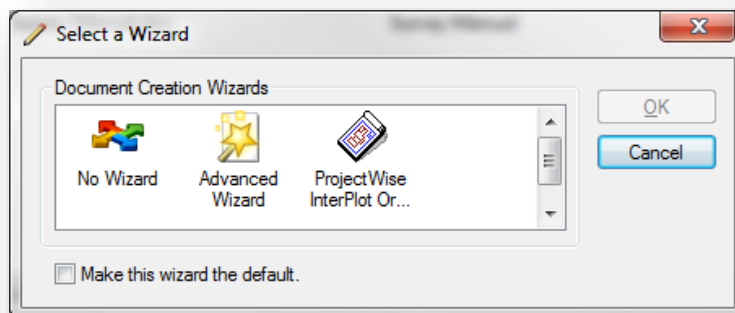


**Document Creation Wizards**

Select the option for Advanced Wizard, which will begin the *Advanced Document Creation Wizard* and the accompanying steps.

*Note:* *It is highly advised that the user NOT check the "Make this wizard the default checkbox".*

On the Select a Template dialog box, enable the *Use ProjectWise document as a template* radio button, and then click Select.
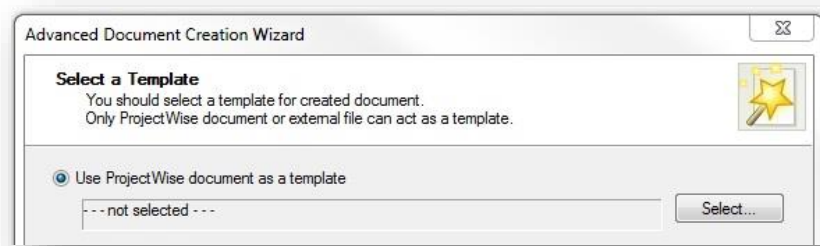


**Advanced Document Creation**

Then, in the folder selection area of the following dialog box, navigate to *Template Documents\Seed\MicroStation,* and select one of the available DGN seed files.
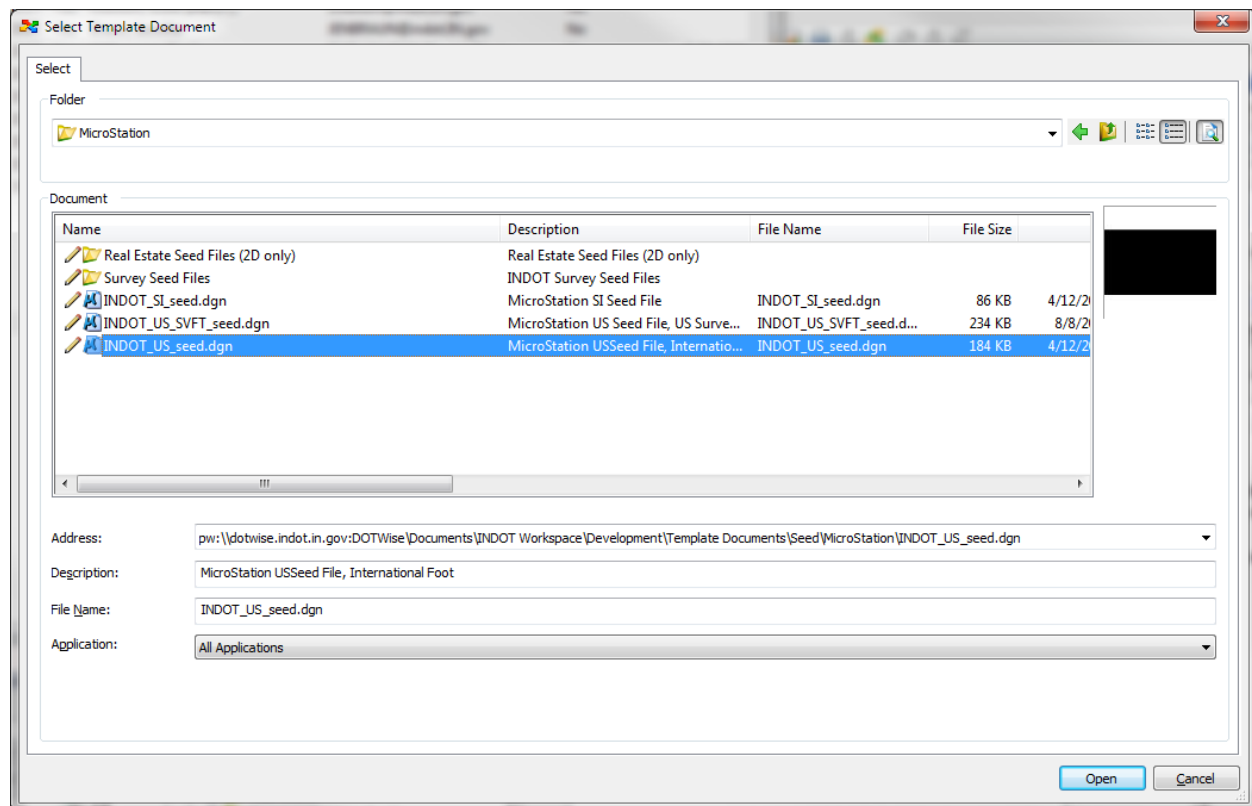


**Selecting a Template Document**

The following can also be found via the BLN Bentley Institute Course Guide Titled *ProjectWise V8i (Select Series 4) User Essentials.*

"A ProjectWise template is the same as a Microsoft template, or a seed file in MicroStation.  It is a file that is copied to create a new document.  You can use a document stored in ProjectWise or a document that resides outside ProjectWise as a template."

With that being said, there have been Template Documents created within ProjectWise for most of the integrated applications/programs used at INDOT.  These include Microsoft Office, MicroStation, ProjectWise Plot Organizer and the Microsoft Excel spreadsheet tables that are pasted as links into MicroStation.

*Note:*   Be sure to give the proper file extension for the document you are creating.

| Example File Extensions | |
|---|---|
| File Type | Extensions |
| MicroStation | .dgn |
| ProjectWise InterPlot | .ips |
| Adobe PDF | .pdf |
| Microsoft Word | .doc or .docx |
| Microsoft Excel | .xls or .xlsx |

### 2.8-2    Importing Documents Into ProjectWise
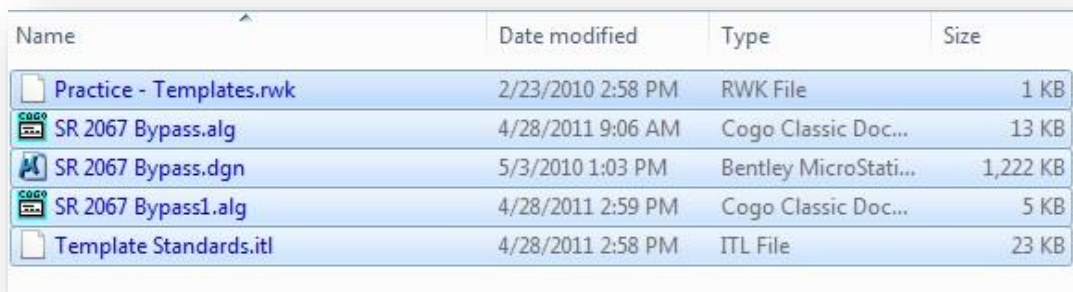
During the course of a project, it is inevitable that you will acquire documents that are not contained within ProjectWise.  Importing a Document into your ProjectWise Project can be accomplished a couple of different ways.

You may receive these documents via email, or CD/DVD, or they may reside on a network server.

#### 2.8-2a        Drag and Drop

The simplest method for moving a file or files into ProjectWise is to simply use the Microsoft Windows method of dragging the file from their current location and dropping it into the appropriate project folder in your ProjectWise Explorer.

1.  Using Windows Explorer, navigate to any document you wish to place into ProjectWise
2.  Select the files as shown in the example.

| Name | Date modified | Type | Size |
|---|---|---|---|
| Practice - Templates.rwk | 2/23/2010 2:58 PM | RWK File | 1 KB |
| SR 2067 Bypass.alg | 4/28/2011 9:06 AM | Cogo Classic Doc... | 13 KB |
| SR 2067 Bypass.dgn | 5/3/2010 1:03 PM | Bentley MicroStati... | 1,222 KB |
| SR 2067 Bypass1.alg | 4/28/2011 2:59 PM | Cogo Classic Doc... | 5 KB |
| Template Standards.itl | 4/28/2011 2:58 PM | ITL File | 23 KB |

**Selecting Files in Windows Explorer**

3. Using Microsoft Windows methodology, drag the selected files and drop them into the appropriate folder of your project.
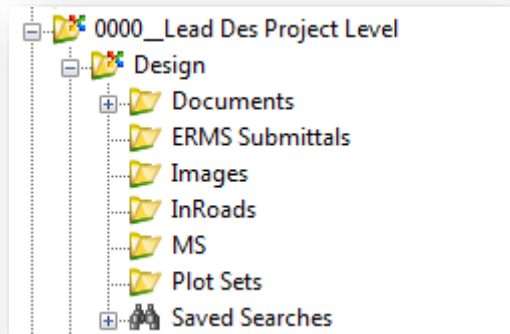


**ProjectWise Project**

4. Since the documents have already been created, you may select No Wizard in the Select a Wizard dialog box.  Click OK.
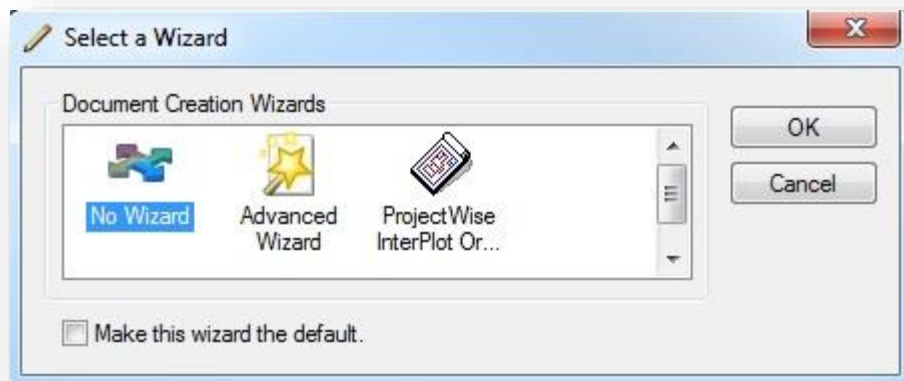


**Document Creation Wizard Selection**

5. After processing, the files should appear in the Documents folder of your Project in ProjectWise Explorer.  If they don't appear during the import process, you may need to refresh your view either by using the View > Refresh command, or by using the F5 key on the keyboard.
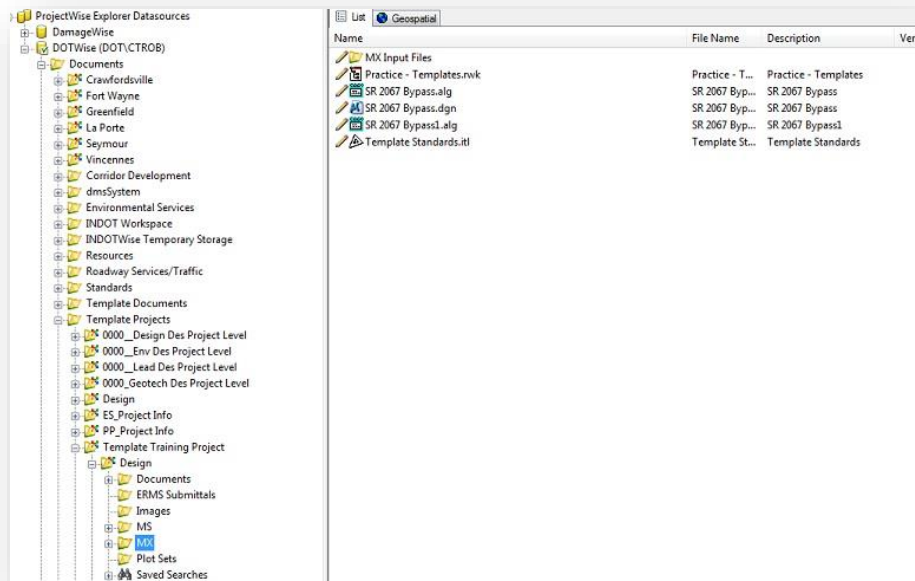
Files Imported into ProjectWise

*Note: When dragging and dropping files into ProjectWise, you're only making a copy of these documents in the ProjectWise datasource. If you no longer need the copies you imported, you can delete them at this time.*

### 2.8-3   Creating folders and Moving Documents

1. In the data source tree of ProjectWise Explorer, in your project, right click on the Documents folder and select New Folder.
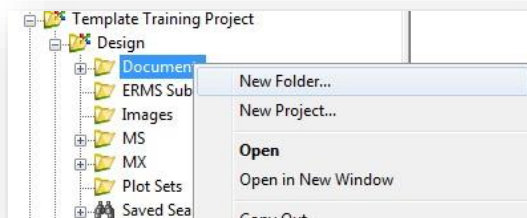


Creating New Folders

2. In the Create Folder dialog box, name the folder.  You may leave the Description field blank.
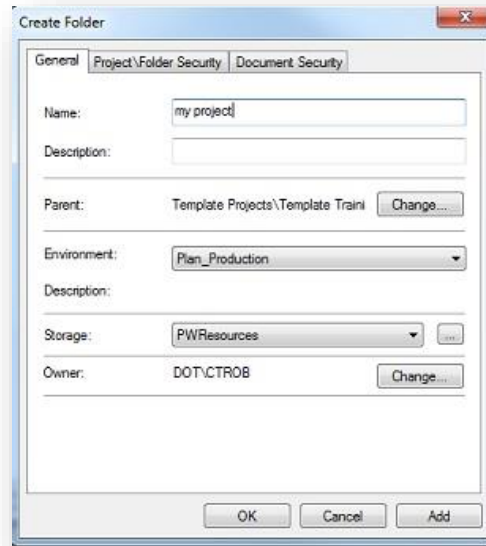


**Create Folder Dialog**

3. Highlight a file then drag it from the Documents window to the Data source tree, and drop it into the folder you created.
4. In the Select a Wizard dialog box, Select No Wizard and click OK.  The document will be copied, not moved to the new location.
5. Now highlight any other files and drag them from the Document Window to another folder in the Data source Tree.
6. This time, in the Select a Wizard dialog box, select Advanced Wizard and click OK.
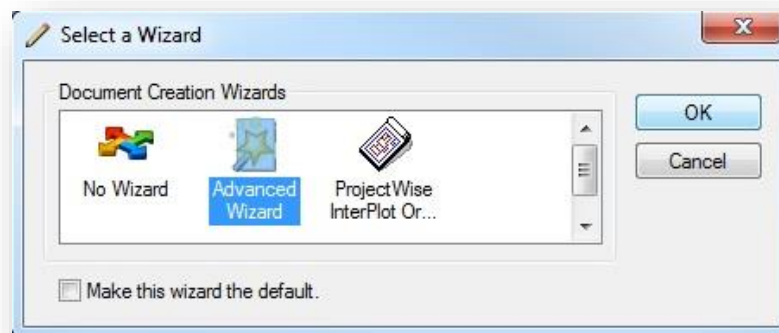


**Wizard Selection Dialog**

7. Take the defaults by clicking *Next* until you get to the Create a Document dialog box.

8. Enable Apply selected option to succeeding documents by clicking in the radio button, then click Next.
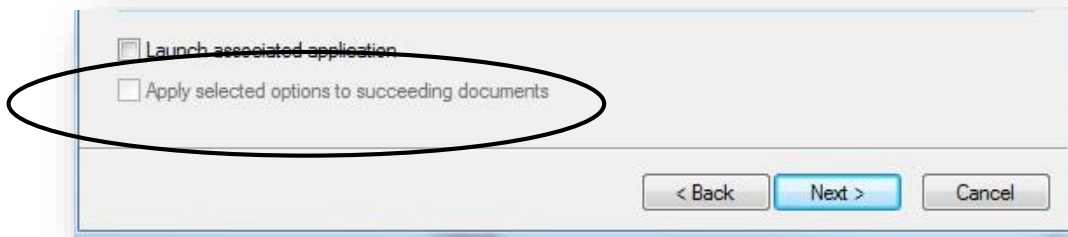


**Apply Selected Options to Succeeding Documents**

9. Click Finish.
10. Notice that the documents have been Copied, not moved into that folder.

### 2.8-4    Save and/or Save As

Should you create a document, such as a word or excel document, on your computer without first creating it in ProjectWise.  You can use the Save and Save As commands to save that document into ProjectWise.

1. Start Microsoft Word or Excel from your *Start > All Programs* menu.
2. Place some text in the document.
3. In the Microsoft Word menu bar, click *File > Save*, or *File > Save As*.
4. You should get the ProjectWise Login dialog box.  Place the following information in the corresponding data fields.  Click Log In.
5. Alternatively, you can select the *Use Windows Single Sign-On for authentication* option.

Datasource:     DOTWise (this should be populated in the pull down)

User Name:     dot\\*your INDOT username*

Password:       *your INDOT password*
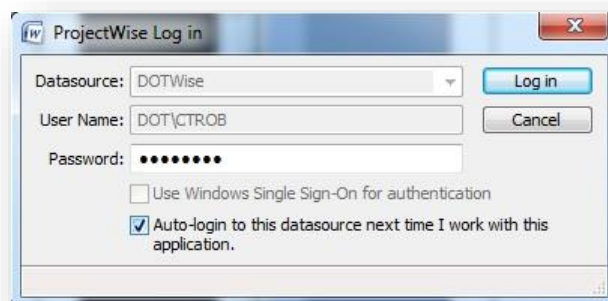


**External Application ProjectWise Login**

6. In the Select a Wizard dialog box, select No Wizard and click OK.
7. In the following Save Document As dialog, click Select and navigate to the folder in your project where you want to save the document.
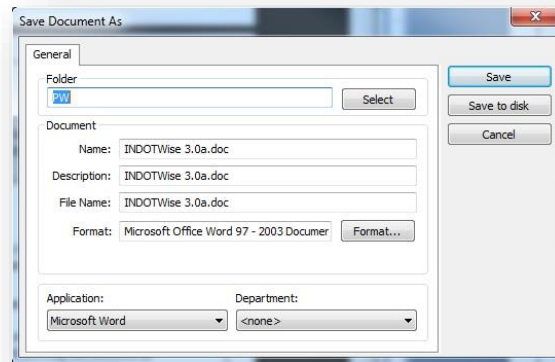


**External Application ProjectWise Save As Dialog**
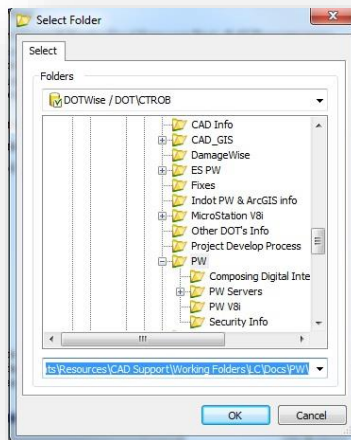


**Save As Folder Selection**

8. Fill in the remainder of the dialog boxes in the Save Documents As dialog box. For ease of navigation, we suggest that you put the extension on the Document name as well as the File Name. The application window should be automatically populated. The Department drop down is optional.
9. Click Save.

*Attention: Upon importing a CAD document (DGN, DWG, etc.) with references into ProjectWise Explorer you will want to run the Reference Scan on the file(s) that you imported. Further information on the Reference Scan tool can be found in the ProjectWise V8i (Select Series 3) User Essentials course and your Help>Contents of ProjectWise.*

## 2.9    Interfaces: The Plan Production Environment

The Environments and Interfaces discussed in the following chapters are intended to be in a constant state of improvement.  Therefore if you require an addition or change at any time, please channel those requests through the proper personnel so that we may attend to them in a timely manner.

*Helpful Hint: By setting your interface before you create a new document, you can complete that interfaces task during the document creation process.*

### 2.9-1    Document Properties

As with the Project Properties, there is information in the Document Properties that is populated utilizing the information contained in the Data Warehouse.  As mentioned earlier, this information is driven by the Designation Number which is entered in the Project Properties.

### 2.9-2    __PROJECT INFORMATION

Each project within DOTWise will contain a non-associated (no extensions, For Information Only) document labeled *"Project Information."*  This document, along with the *__Project Information* interface, can be used to view information that was retrieved using either the SPMS system or by going to the Management Information Portal (MIP).
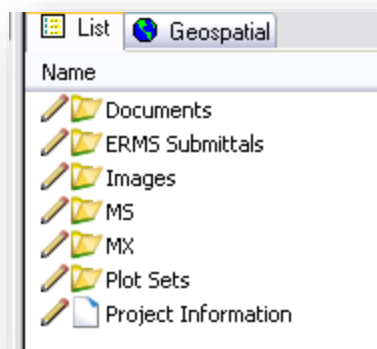


**Design Folders w/Project Information Document**

In the *Plan_Production* Environment however, the *__Project Information* interface can and should be used for much more than just reporting information that can be accessed in other locations.

#### 2.9-2a    __PROJECT INFORMATION Interface, Attributes Tab (Universal Title Sheet)

The Universal Title sheet is intended for use with *ALL* Title sheets.  As was the case with the previous release of INDOTWise, a Null response is accepted.  This means that if you do not have information for a certain field in the interface, then it is acceptable to leave that field blank.  (Example:  Bridge information on a Roadway project)

To access the Universal Title sheet, set your Interface to *__Project Information* and go to the properties of the applicable file.  (Hint:  The shift bar is a shortcut to document properties.)
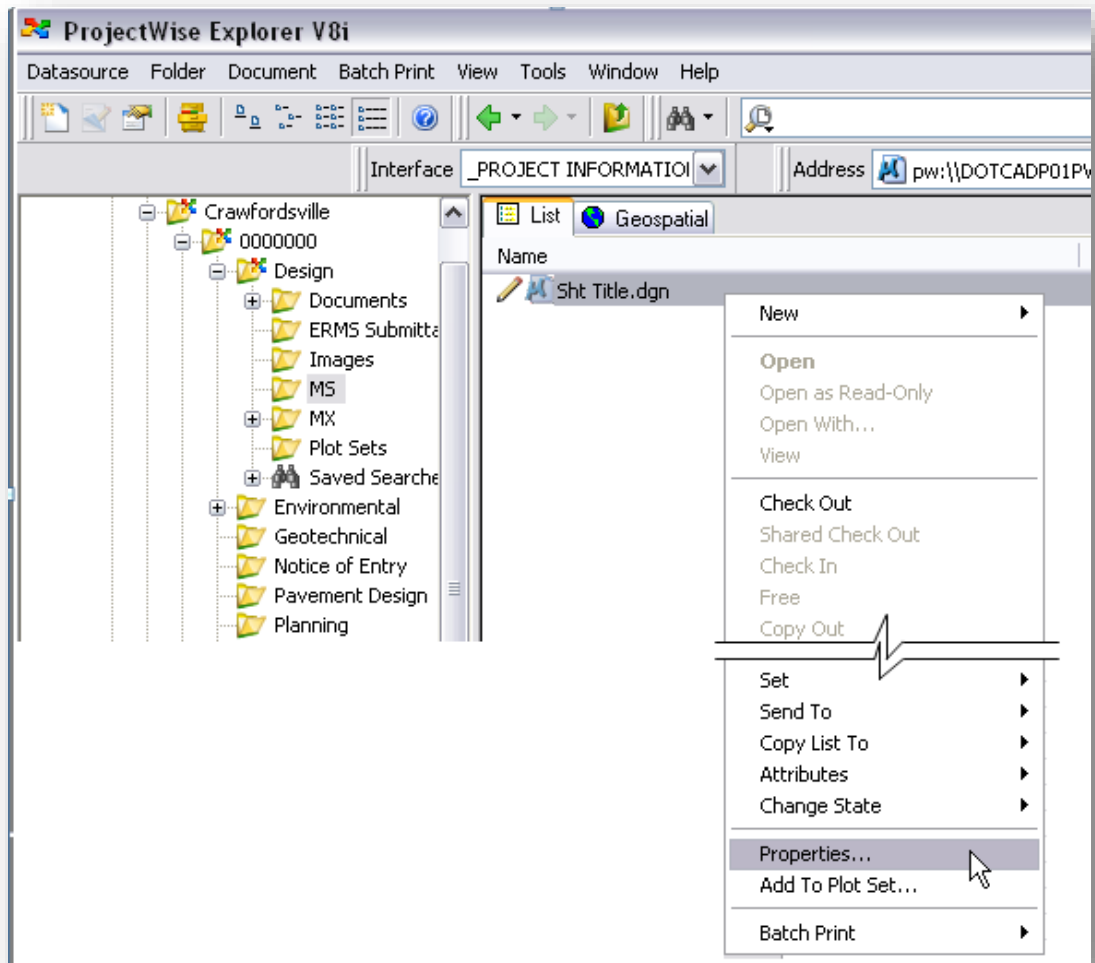
**Opening Document Properties**

On the *Document Properties* dialog, select the *Attributes* tab.

**The Universal Title Sheet Interface**

This interface has been created with the intention that it should serve every title sheet in use by INDOT Design. This includes 24" x 36" Roadway and Bridge Title sheets, as well as the 8.5" x 11" Title sheets.

### 2.9-2b    __PROJECT INFORMATION Interface, More Attributes Tab (Project Information)

The *More Attributes* tab provides some of the information that would otherwise be found in the MIP or SPMS. This is provided for your convenience. However there are a few fields to take note of:

**More Attributes**

***Document File Name:*** This is provided as an additional resource for INDOT users to cut and paste the document file name into a problem report.

***Update Project Info***: The More Attributes tab is set up in such a manner that all fields should update automatically. However, there may be a time that the user wishes to make sure he or she has the most current information. In that case, simply select "***UPDATE***" in the editable field (pull down), then select "***Save***" from the dialog box.

### 2.9-3    __SIGNATURE
Use of the __SIGNATURE interface is discussed in Chapter 4 of this manual

### 2.9-4    REVISIONS
The REVISIONS interface has not changed and is still used in the same manner as the previous release.

### 2.9-5   DESIGNED/DRAWN/CHECKED BY

Due to the ability to create multiple sheets in one .dgn, the Title Block Integration for this interface has been removed from the INDOT sheet models.  However, we have provided a methodology for using this interface, for those that wish to take advantage of this functionality.  By default, some of the InRoads sheets do contain this functionality, so please verify whether or not your file has these fields prior to replacing them.

### 2.9-6   ERMS Upload

This is a new Interface for use with the ProjectWise to ERMS tools discussed in section 2.18.  This is an informational interface used to give the user information on who the last user was to send the document to ERMS, when it was sent, and what state the document was in when sent.

## 2.10     Title Block Integration

### 2.10-1  Overview:

Due to the move from using Project Information to populate our title blocks to using document interfaces, there has been a new task bar developed in MicroStation to allow for use of some of our Title Block Integration cells (tag sets).

The new task bar is titled *Title Block Integration* and can be found under the INDOT Tools workflow:
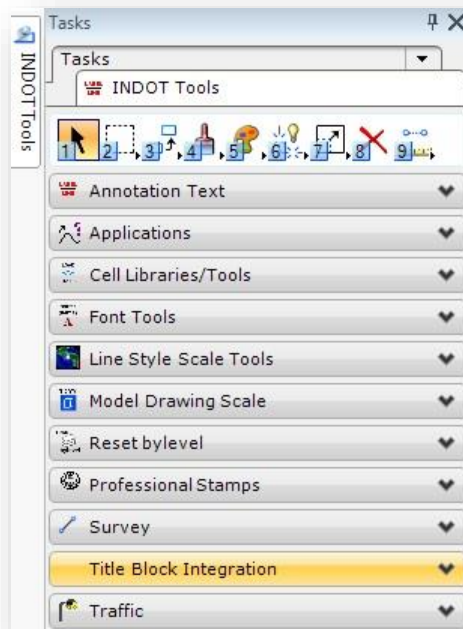


**Task Navigation – Title Block Integration**

The Title Block Integration task bar consists of only two tasks:
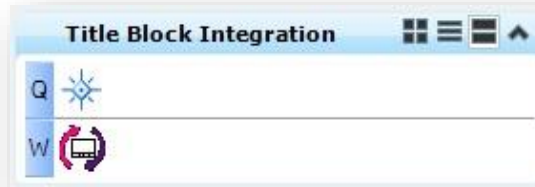
**Title Block Integration Tools**

- *Attach Cell Library:* This attaches the "*Title Sheet Integration*" cell library which in turn contains 5 cells for use with the various interfaces available.
- *Update Title Block:* This updates all title block information driven by document interfaces.

### 2.10-2 Title Sheet Integration Cell Library

The Title Sheet Integration Cell Library consists of 5 cells. The orientation of these cells is set so that the lower right corner of the large "D" size sheets.



#### 2.10-2a     elect_sig_box

The elect_sig_box cell is intended to be used with electronic signatures. The process of utilizing electronic signatures is discussed in detail in Chapter 4.
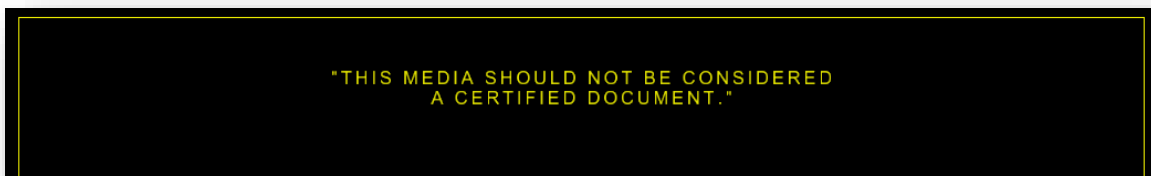


**Signature Placeholder**

#### 2.10-2b     checkedby

The checkedby cell is intended to be used with the *DRAWN/DESIGNED/CHECKED* interface and the *Plan Production* environment within ProjectWise.

```
                                                                                              $SCALE$


    $DESBY$        $DES_DT$          $DWNBY$         $DWN_DT$

$DESCHKBY$$DESCHK_DT$              $DWNCHKB$$DWNCHK_DT$
```

**Drawn By/Checked By Cells**
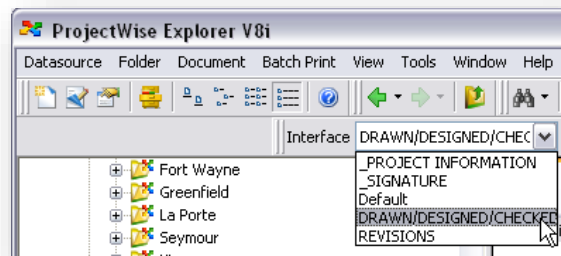


**Drawn By/Checked By Interface Selection**



**Drawn By/Checked By Interface**

### 2.10-2c     Revisions

The revisions cell is intended to be used with the *REVISIONS* interface and the *Plan Production* environment within ProjectWise.

**Revisions Cell**



**Revisions Interface Selection**

**Revisions Interface**

### 2.10-2d    sht_num

The sht_num cell is intended to be used with the automatic page numbering feature available through ProjectWise InterPlot Organizer.

### 2.10-2e    signature

The signature cell is intended to be used with the _SIGNATURE interface and the Plan Production environment within ProjectWise.  Further instructions on the use of this feature are in Chapter 4 of this manual.



**Signature Cell**
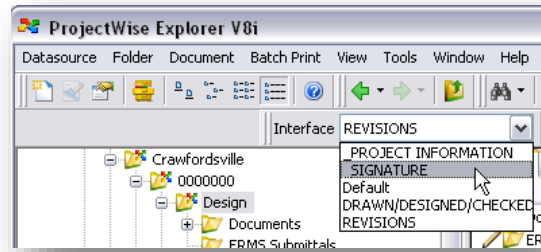
**Signature Interface Selection**
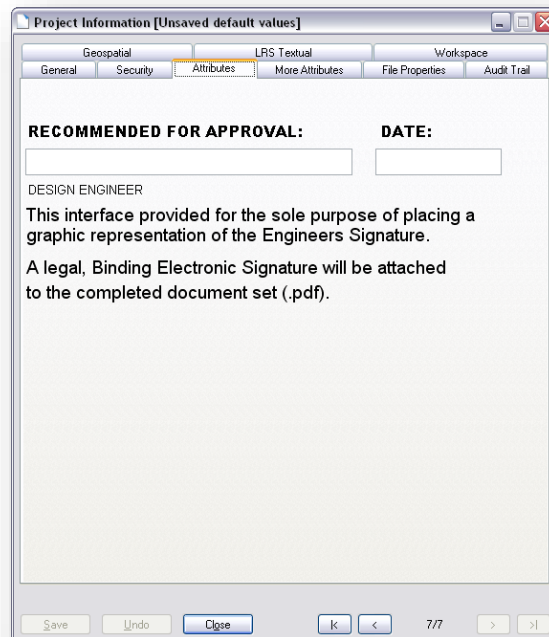


**Signature Interface**

*WARNING:  With the exception of the sheet_num cell, all of the cells contain tag sets with very distinctive names.  Placement of the cells in sheet models that already contain these tags, or placing duplicate cells in sheet models, may result in these cells not working.  If you have issues of this type please contact CAD Support via a Help Desk ticket.*

## 2.11      ProjectWise Interfaces and Special Character Integration

With the DOTWise 3.1 (Fall 2012)  release of the CAD Workspace, non-True Type fonts are no longer available for use in the CAD Environment, with the exception of the SignCAD fonts.  Users will notice that all fonts will now appear in the font drop-down list within MicroStation preceded with a TT whereas in the past their names may have been preceded by the Bentley B.

Also with this change, a number of special characters are not directly available for use in certain ProjectWise Interfaces, although they may be accessed as Windows Special Characters. One application in particular is the Universal Title Sheet interface (section 2.9-2a) in ProjectWise as it is used to place the project latitude and longitude on an INDOT title sheet.

In general, in order to place a special character when no Insert Symbol command or shortcut is available, users must hold the ALT key and type a series of digits from the number pad (the primary keyboard number row will not work in combination with the ALT key). In the case of placing the degree symbol in the latitude and longitude values, the key-in sequence is ALT+0176. See the table at the end of this section for a listing of common windows special characters.

Example: For 6 degrees 23 minutes and 23 seconds you would type 6[ALT+0176]23'23" to obtain the result shown below.



MicroStation will then process the degree symbol and place it where called by a tag on one of the template title sheets, as shown below.



## Special Characters

| Symbol | Key-In | Description |
| --- | --- | --- |
| ° | ALT 0176 | Degrees |
| ± | ALT 0177 | Plus or minus |
| ¼ | ALT 0188 | Fraction: One Fourth |
| ½ | ALT 0189 | Fraction: One Half |
| ¾ | ALT 0190 | Fraction: Three Fourths |

## 2.12    Revised Template Sheet Models

### 2.12-1  Overview:

To reduce duplication and ease navigation, we have split up sheets_eng.dgn into two separate files.

D size_sheets.dgn:  All 24 x 36 (D size) sheet models now reside in this design file.

Ltr_sheets.dgn:  All 8.5 x 11 (letter size) sheet models now reside in this design file.

In addition to separating the large format sheet models from the smaller ones, MicroStation's ability to convert units on the fly has allowed for the metric versions of these sheet models to be removed.

## 2.13    Searching

### 2.13-1  Search Form and Search Builder

As with the previous version of ProjectWise, searching plays an important role in interacting with your documents on a day to day basis.  Searching via the Search Form or Search builder has not change significantly in this version.  (Information from the *ProjectWise V8i (Select Series 3) User Essentials* course is still applicable.)

The largest change to searching in this version deals with the new interfaces being provided for attribute data.  As shown in the previous chapter, a large amount of document attribute data is being processed automatically out of SPMS.  In order to search for this data, we will need to use the Search Form with the appropriate Environment and Interface selected.

### 2.13-2  Performing a Search on Document Attributes
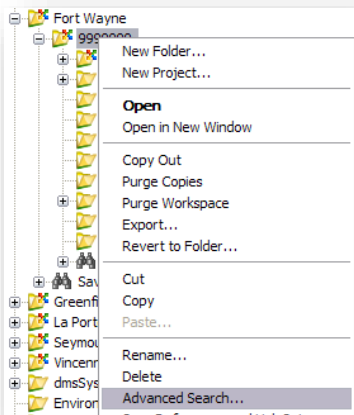


Starting an Advanced Search

- Select your folder via a right-click and navigate to *Advanced Search*:
- You will then be prompted for the search method you would like to use.  For this example, we will be using the *Search Form*.  You could also select the *Search Builder* should you prefer to perform your search in a different method.  At this time, you may also define one of the

methods as your default search style.  Should you need to change this setting, you may adjust the options under *Tools > Wizard Manager* and selecting the Search Definition Tab.
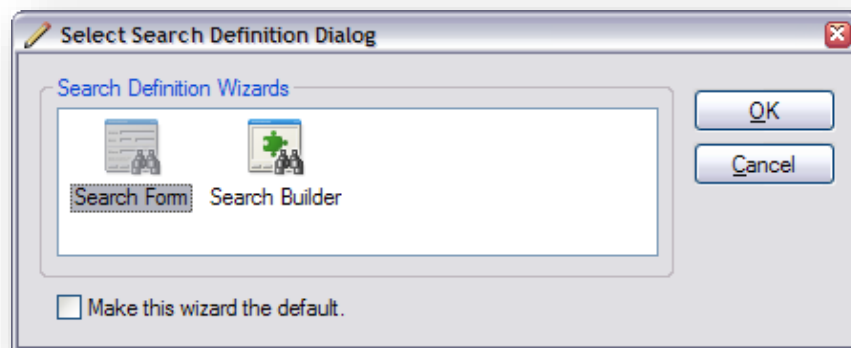
**Selecting a Search Type**

- Once in the Search Form, you will need to define the Environment you're searching in.  This is done by adjusting the Environment Name area in the Folder portion of the panel.  In the following illustration, we are showing a selection being performed on documents in the Plan_Production environment.  It is NOT required that you toggle "Find in this Environment only" for these searches, however it is recommended.  Should an identically named attribute be present in a different environment and have information that is the same as what you've searched on, it will be returned as a valid result.
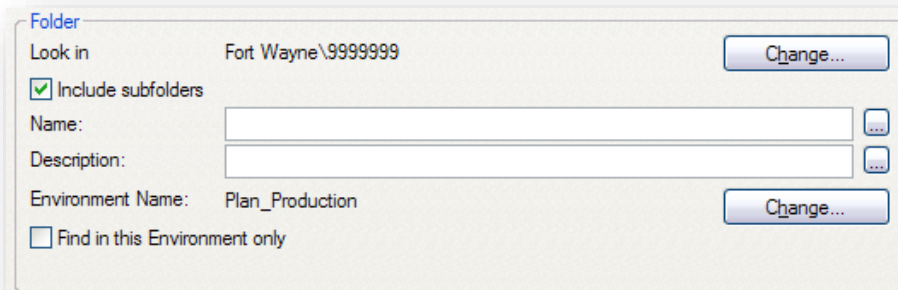
**Folder and Environment Definition**

**Searching Title Sheet Attributes**



**Searching More Attributes**

- Once you've selected the environment you'd like to search with, you will then navigate to the Attributes or More Attributes tab (This is dependent on the environment your documents use, further information provided in the first section of this document.) at the top of the Search Form.  On this panel, you will see the attribute layout for the environment.  For this example, we're looking at the INDOT Universal attribute layout for Plan_Production.

*Note:  Unlike the document attribute panel, the Search Form version of this panel has no locked fields.  This is to allow you the ability to search on any field available and retrieve documents that have the information you need.*
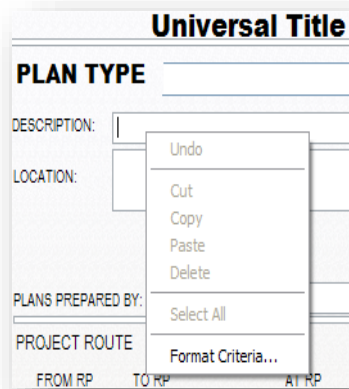


Format Criteria for Searches

At this point, you will then be able to search for documents using any available field on the Attribute Panel.  As a reminder, you can use Format Criteria on any field in order to perform more intelligent searches.  You can do this by right-clicking any field as shown and selecting *Format Criteria*.

As you complete the setup of your search, you may then execute the search, or proceed to save it and re-use it as necessary.  The default behavior for saved searches is to associate them with the project you're currently working in.  Should you wish to adjust this, you will need to browse to the ROOT level in the location browser.  This will allow you to save your own personal searches that are not associated to a specific project.

### 2.13-3  Saved Searches

Within ProjectWise, pre-configured saved searches are now being provided.  At the district level, Saved Searches that relate to each Discipline are provided; such as Survey, Design, etc.  Under each Des. No., searches are provided for a variety of document types and time last modification times.  These are basic searches over the entire project but will allow for a quick access to information within.
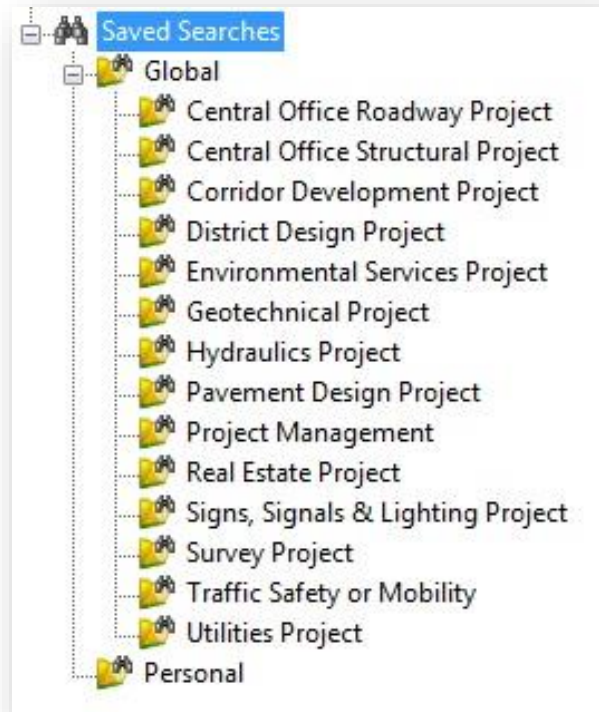
District Level Saved Searches

*Note:  When performing saved searches, we recommend you push the output to a new window.  You can do this by right clicking on the saved search and selecting Start Saved Search in a New Window as shown:*
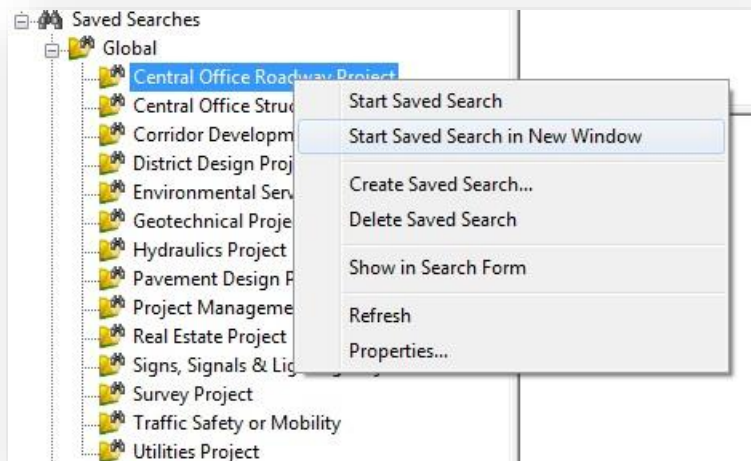


Running a Saved Search to a New Window

This will provide a secondary window with your search results allowing for the ability to browse both the datasource and your search at the same time.

## 2.14    Custom Folders

With the current folder structure being used in ProjectWise, all users will see the full list of active projects across the agency.  In order to ease browsing through this data to get to the project you need, *Custom Folders* have been enabled for your use.

In your document tree you will see an entry for Custom Folders underneath the Documents folder:
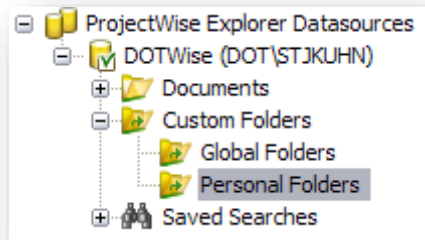


Custom Folders

The Custom Folders can be thought of as a "Favorites" for ProjectWise.  By using these folders, you can virtually bookmark your project in the datasource allowing for fast access without the need to drill into the datasource to find it.  When linking to documents or full projects within the datasource, all data in that location is virtually linked back to the location of files/projects in ProjectWise.  As this is a live link to the original data, all rights in regards to folder/document creation/deletion apply.

*Note:  If you delete a document in your custom folders, it will delete it from the data source if you have the document delete rights.*

The following steps will walk you through the steps of creating a set of Custom Folders and linking to your data.

### 2.14-1  Using Custom Folders

1. In ProjectWise, navigate to the Custom Folders and expand them.  Right click on *Personal Folders* and select create:
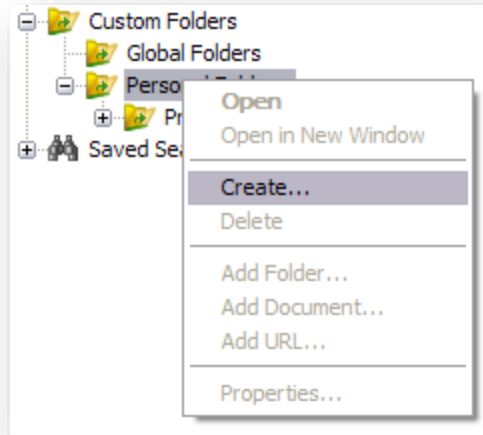
**Creating a Custom Folder**

2. When prompted, create your personal folders.  Some possible custom folders you may wish to have are for active projects, region projects, or for resource documentation.
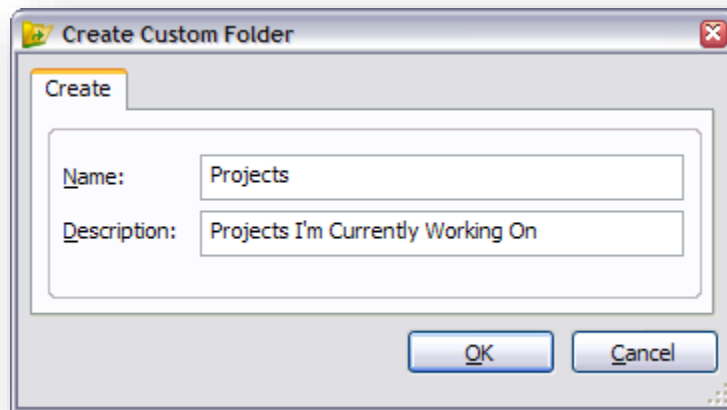


**Creating a Custom Folder**

3. Once you've created your folder, it shows up under the Personal Folders in ProjectWise.  This folder is one only you can see, so each person will need to setup their Custom Folders however benefits them the most.
4. At this point, you're now ready to begin populating your Custom Folder.  You do this by dragging and dropping anything you'd like into the Custom Folder of your choosing.  This will create a live link to your data.
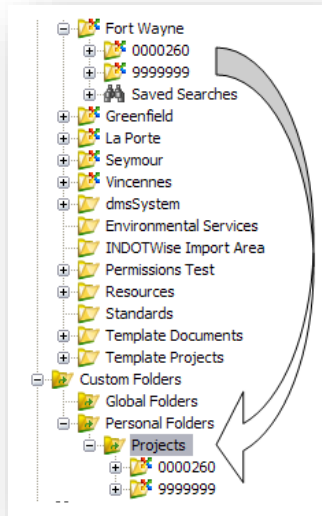
**Dragging a Folder/Document into Custom Folders**

5. Should you wish to remove any link from your custom folder, right click on the project/file and select *Remove from Folder*.  This will remove the link without modifying your data.  Any other method of deletion/removal will delete your data depending on your permission levels.
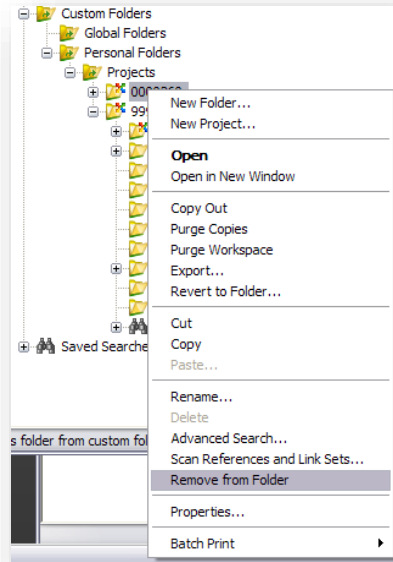


**Removing an Item from Custom Folders**

## 2.15    Applications without ProjectWise Integration

As has been discussed, ProjectWise provides a managed environment for working with your documents and data.  It achieves this through a combination of file operations and application integration with applications such as MicroStation, ProjectWise InterPlot, and Microsoft Office Applications.  The user experience with these applications is almost transparent as the direct application integration allows the user to open/modify/save files directly to and from the ProjectWise datasource.

What happens with applications that are not integrated though?  This section will explain the events that happen and procedures that will need to be taken to work with a small subset of the applications that are used by Production during the Project Lifecycle.

Currently, there are a few non Bentley applications that are being used at INDOT that do not have native ProjectWise integration (i.e. MathCAD, SignCAD).  If you have questions about a particular application you are using and its integration with ProjectWise contact CAD support.

As these programs lack ProjectWise Integration, you may have to perform additional steps to retrieve your data and then work with it.  In the following sections we will discuss the options available to work with these types of data.

### 2.15-1  Working with Non-Integrated Applications

ProjectWise allows the end user to work with applications that are not integrated two ways.  The first way is by providing a semi-managed/integrated environment.  In this instance, ProjectWise relies on the file extension to guess what application the file should be opened in.

*Warning:  The following procedure only works with single files.  Applications that rely on more than one file, or a master file and multiple data files will need to be handled in a different manner which is discussed later in this section.*

For example, we'll examine the behavior of .log files.  Outside of ProjectWise, when a .log file is opened, it will automatically start Notepad, as Windows Explorer knows that this is the application that should be used.  In the ProjectWise environment, you will see similar behavior.  When a .log file is opened from the ProjectWise environment, you will be prompted with the following:
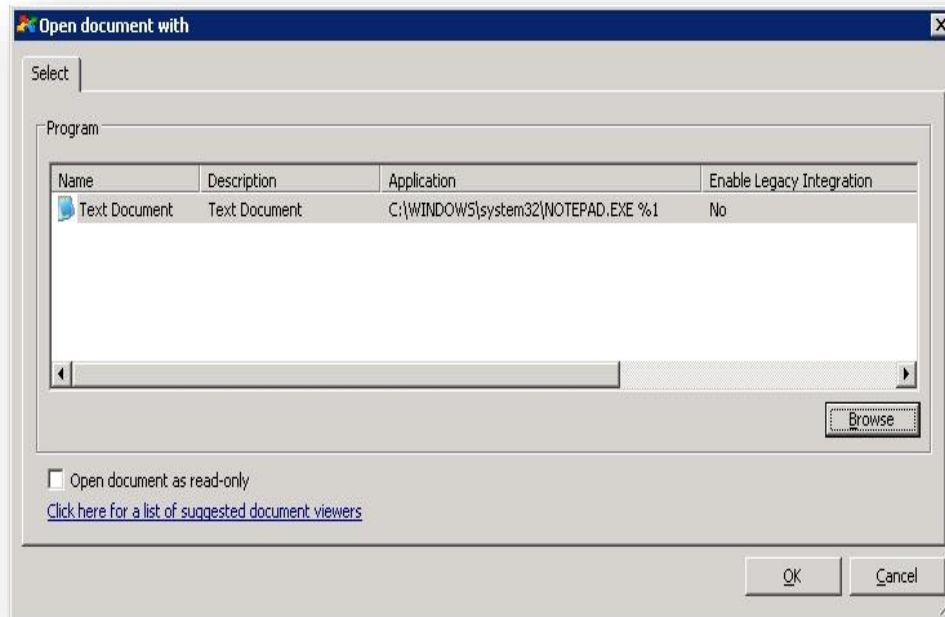
**Open Document With Dialog**

ProjectWise communicates with Windows Explorer to check what application it should open the file with.  In the case of .log files, ProjectWise finds that Windows Explorer wants to open the file with Notepad, so it makes the same assumption.  This is not static behavior however.  As shown in the previous illustration, ProjectWise first prompts you via the "Open Document With" window.  This document will show all of the available options with which a file can be opened and you may then choose the desired application.  Additionally, you are also provided a Browse button; you may manually define the application you wish to open the file with.  The applications listed in this option are a list of commonly available applications on the computer you're working at.

**Open document with**

Programs

<span style="font-family:monospace">vm</span> Default Host Application
Internet Connection Wizard
Internet Explorer (Ver 1.0)
Microsoft Synchronization Manager
MicroStation V8i (SELECT series 2)
Notepad
Paint
Windows Media Player
Windows Media Player
Windows Picture and Fax Viewer
WordPad Document
XPS document

Browse

Click here for a list of suggested document viewers

OK   Cancel

**Selecting an Application to Open With**

Once satisfied with the application selected to open the file, you may then work with it normally.

While working in the application, you will notice some differences from working in an integrated application.  In a non-integrated application, when you perform save/open operations, you will not receive the ProjectWise dialog windows, but rather, the standard Windows Explorer ones.  This will also be true for any file operation command that would prompt you with similar options such as an import/export, an attachment, or a link.

As you complete work with the file, you are then ready to check the document back in.  ProjectWise remembers the application that opened the file and maintains knowledge of its status as you're working on them.  When you've completed work, you will need to save your file, and then exit the application.  As the application closes, ProjectWise will see that work on the file has completed and will then prompt you to check the file in.
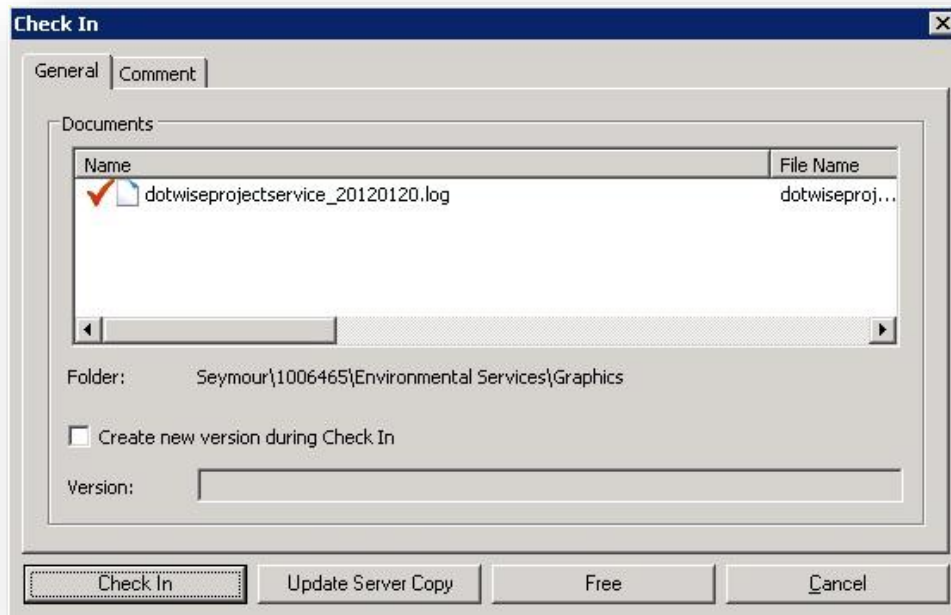
**Document Check In**

It should be noted, that this will only happen when the application is closed, as ProjectWise only maintains knowledge of the application and not the file operations (Save As, File -> Close, etc.) performed within it.

### 2.15-2  Working with Documents of an unknown type or multiple files

As shown in the prior example, ProjectWise is very flexible in maintaining control over applications when working with single files.  For applications that rely on multiple files, a master file and additional data files, or a single file that does not have an application association; a different procedure is required.

For files that match the preceding criteria, you will need to use the document export tools within ProjectWise.  The document export process is a ProjectWise managed process that places files in a location of your choosing, while maintaining knowledge of these files for re-import at a later time.

For this example, you can use any small group of files.  To start the export process, select the files you wish to export and select the Export option by right clicking on the files, or selecting the option from the Document menu.
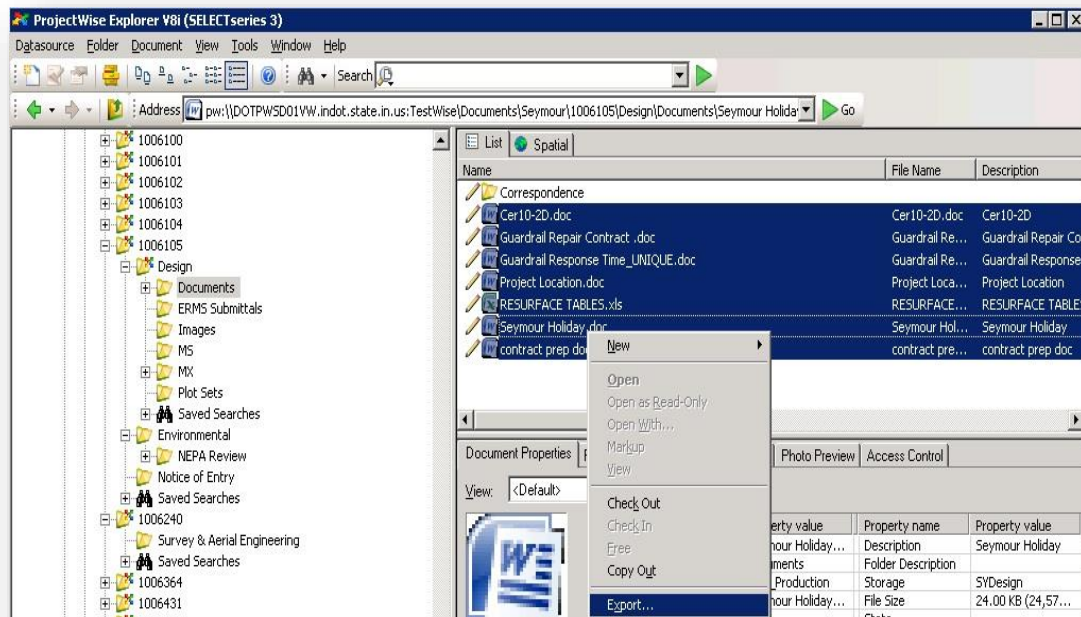
**The Document Export Command**

This will start the ProjectWise Document Export Wizard; the first panel is information and may be skipped. On the second panel, you are prompted to select the method with which you'd like to retrieve your document. The two options presented are *Export* and *Send to Folder*. To maintain a semi-managed environment, we will be selecting the Export option as it allows ProjectWise to maintain knowledge of the exported file and allows for later re-import. The Send to Folder option should only be used when you want to create an unmanaged copy; which causes ProjectWise to only make a copy of your file locally with no method of re-import.

On this panel, you also need to select the folder where you'd like to export the files. When selecting this location you must make sure that you select a location that is consistent and predictable. If you do not specify locations in this manner, the potential for data loss exists, or the possibility of overwriting data. For the example shown here, the path of C:\Projects\DesNo_SR has been chosen. During production use, this would translate into the Des. No. and route of the project you are exporting files from. This gives you an easily identifiable container to place your files while working on them.

Once you're satisfied with the export location, you may then select the Next button.
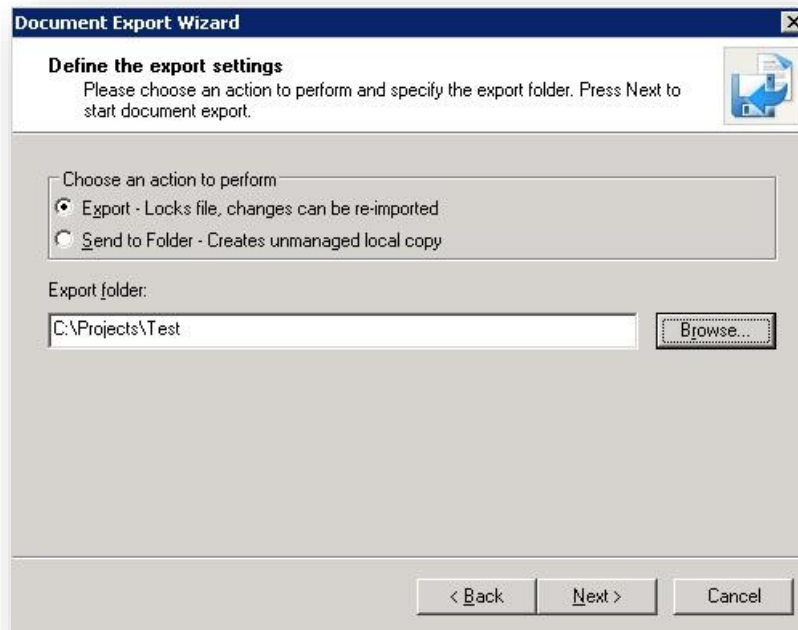
**Document Export Wizard**

The documents will be exported from ProjectWise and their icons will change to denote that they are exported.
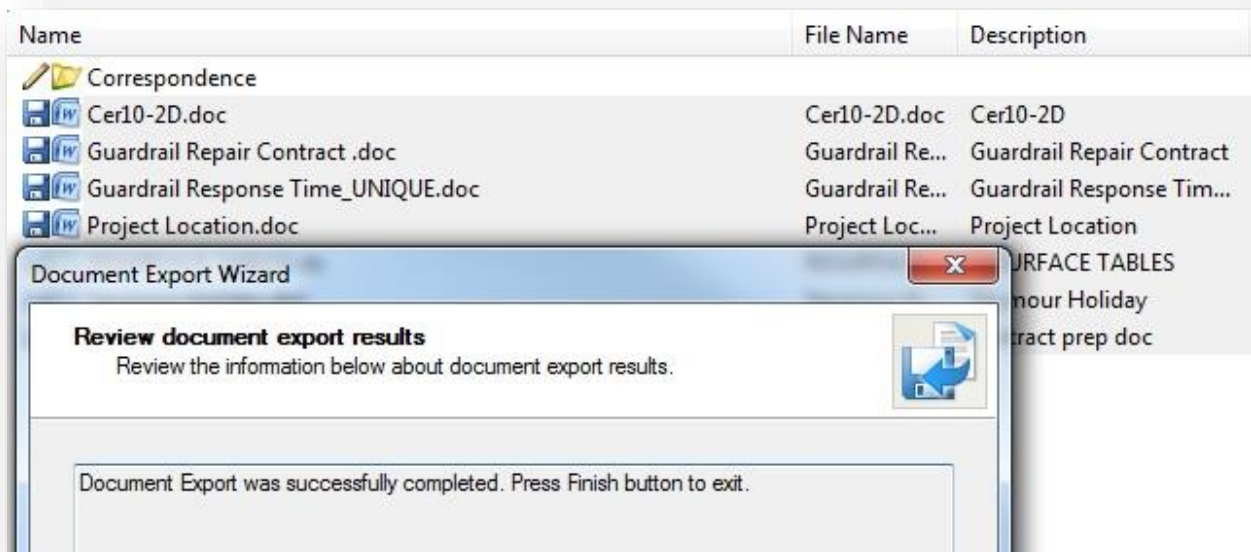


**Completed Document Export**

You're now free to work on the files how you normally would outside of ProjectWise. As the files are not being opened within ProjectWise, no automatic prompts for check in will be shown. Also, in the event your files exported are DGNs, it is probable that the appropriate libraries are unavailable.

Upon completion of working with your files, you will then need to re-import the documents back into the datasource. To perform this step, you may either use the Local Document Organizer, or highlight an exported document and select Import from the Document/right-click menu. *To provide the utmost data security, and flexibility in data sharing, it is recommended that you re-import your data daily*. In the event of PC hardware problems, this will prevent large amounts of data and work loss, along with making the most up-to-date copies of your data available for use by other members of the project.

The single document Import process behaves as though you're checking in the file that was exported. You will be prompted to add meaningful comments during the check-in process as you are with other documents.

To re-import your data, you will use the Local Document Organizer that is a component of ProjectWise Explorer. This can be found under the *Tools -> Local Document Organizer*. You will be presented with the following window:
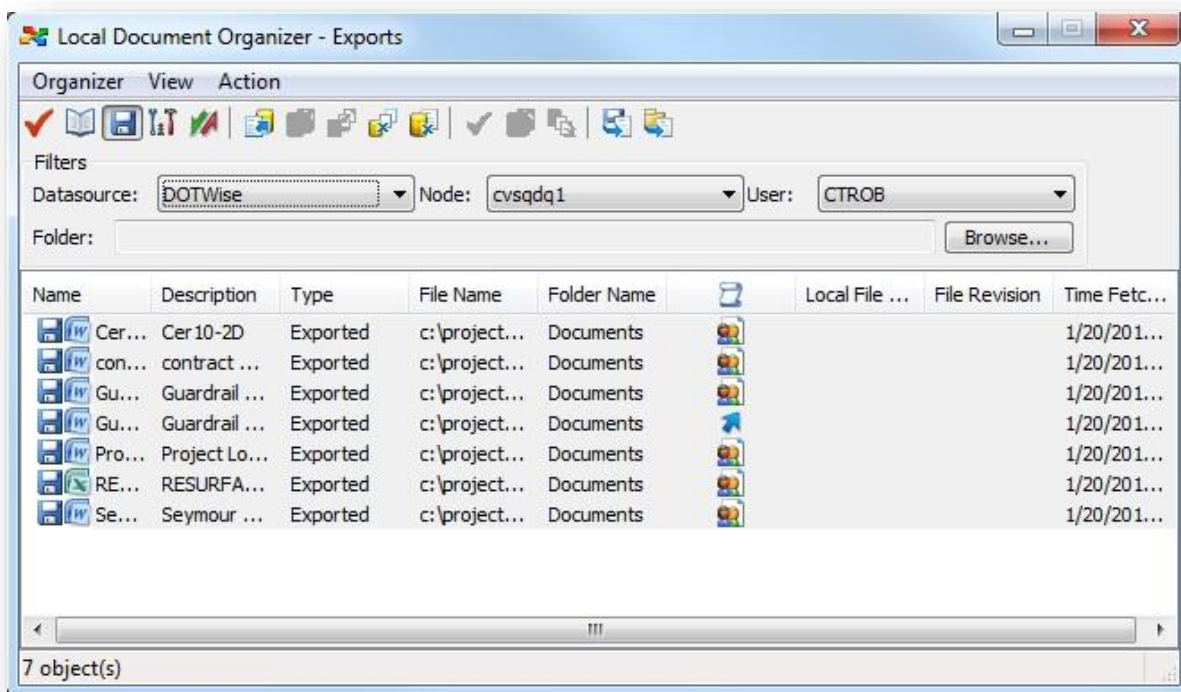


Local Document Organizer

This tool defaults to having only Checked Out documents shown. You will *change the filter to the Exports (floppy disk)* option as shown in the prior image. To ease the re-import process, it is suggested that you sort your exported documents by file name. This will make sure that all

documents in that location are together.  To re-import the documents, you then need to *select all of the files that you'd like to re-import and right-click on them.  Select* the *import* option as shown.
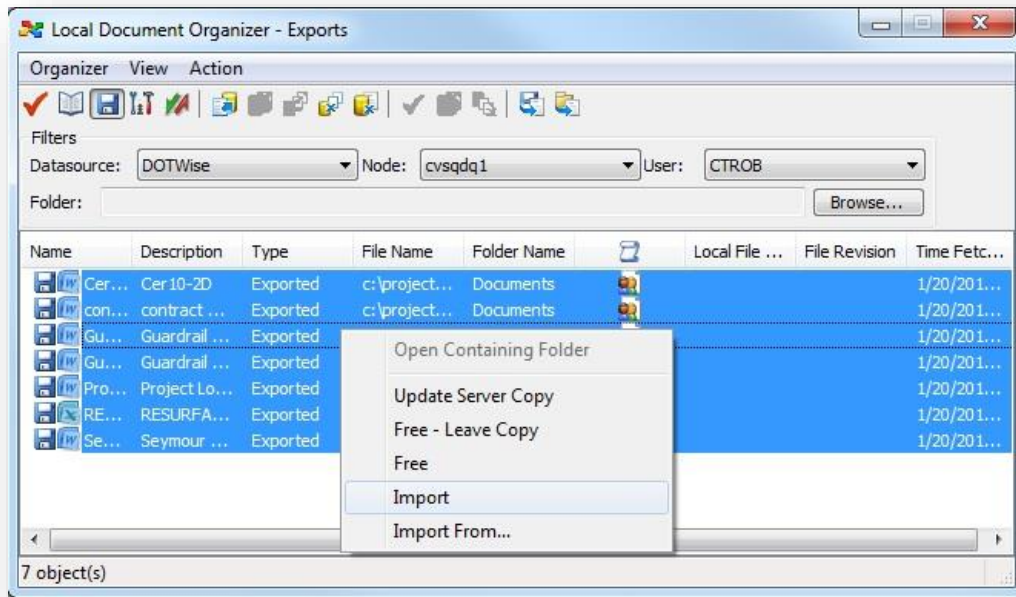


Import Menu Item

Once you've selected the import option, you will be prompted to enter any relevant comments pertaining to this operation.  Relevant comments include any operations you may have performed.
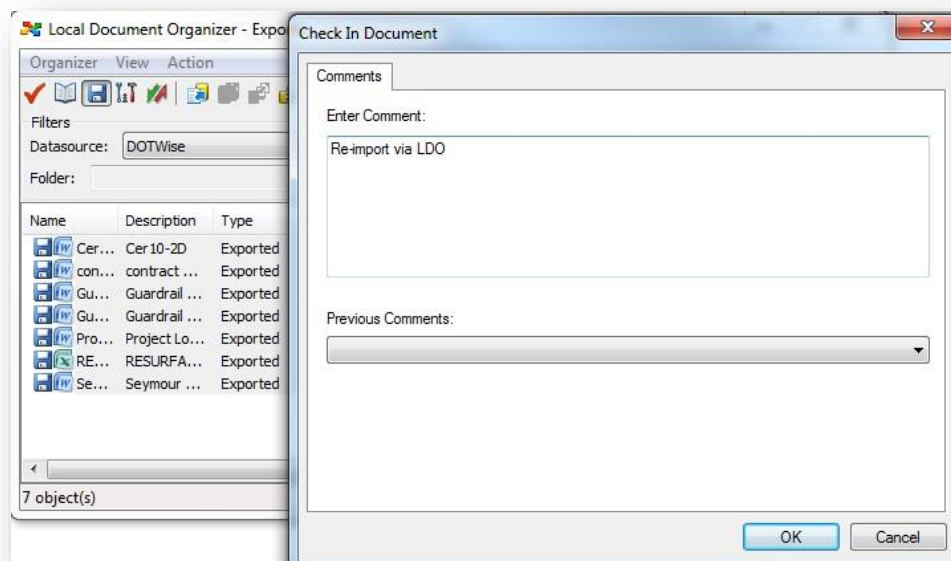


Document Check In

This will re-import and remove any documents that you initially exported prior to working with your data.  Any new files will remain in the designated location on your PC.  To bring these newly created documents into ProjectWise, you will need to open the export location on your PC in Windows Explorer, and select the remaining files (no subfolders) and drag and drop these files into the necessary folder for your project in ProjectWise.
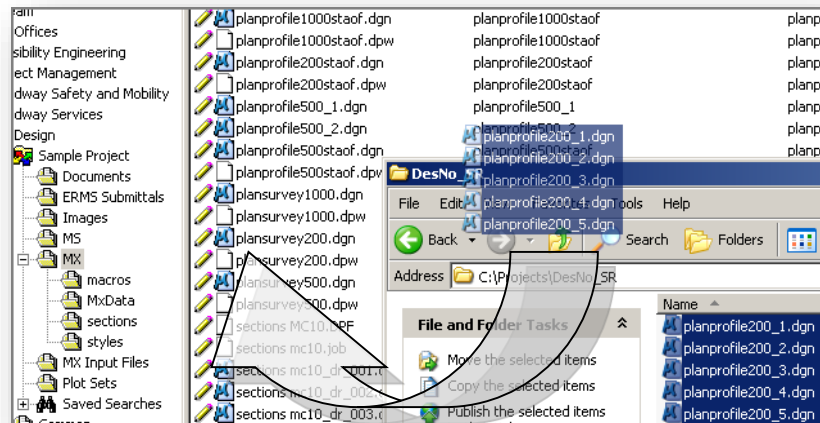


**Drag and Drop of New Files**

*The Document Export Process: Things to remember!*

- *Make sure you export your documents to a consistent and predictable location.*
- *Re-import your data daily, it is your responsibility to maintain your most recent data.*
- *Do not move exported files, as ProjectWise only retains information regarding these files when they are in their exported locations.  Moving these files presents the potential for data loss.*

## 2.16     LEAP Bridge Integration with ProjectWise

Unlike typical Bentley applications, LEAP Bridge integrates in a different fashion in the ProjectWise environment.  A couple of notes before reviewing the integration process:

- LEAP Bridge Projects cannot be setup to automatically open when double-clicked.
- All LEAP Bridge file management functions (Open, Add, Update) for ProjectWise must be performed from within their respective applications (RC-Pier, Conbox, Conspan, Geomath, LEAP Bridge).
- The following steps will not work with Consys as this application has not been updated since its initial Bentley release and ProjectWise integration is not available.
- When working with LEAP and ProjectWise, it is not necessary to manually check files out or in.  The LEAP products handle these functions automatically.

This behavior is different from both the standard double click in ProjectWise integration that the Office apps and MicroStation both employ, nor does this integration require a method similar to how

other integration-free applications work.  The remainder of this section will look at enabling integration and how it functions for the various modules.

### 2.16-1  Enabling LEAP Bridge ProjectWise Integration

To enable ProjectWise integration in LEAP Bridge, the following steps must be performed:

1. Start LEAP Bridge Enterprise from the Start Menu (*Start Menu > All Programs > Bentley > LEAP Bridge Enterprise > LEAP Bridge Enterprise*).
2. With LEAP Bridge open, go to the *Options > Preferences* menu.
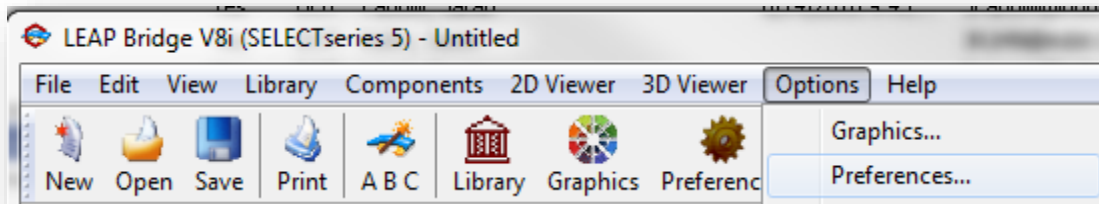


3. Locate the ProjectWise Preferences section at the bottom of the Preferences window.
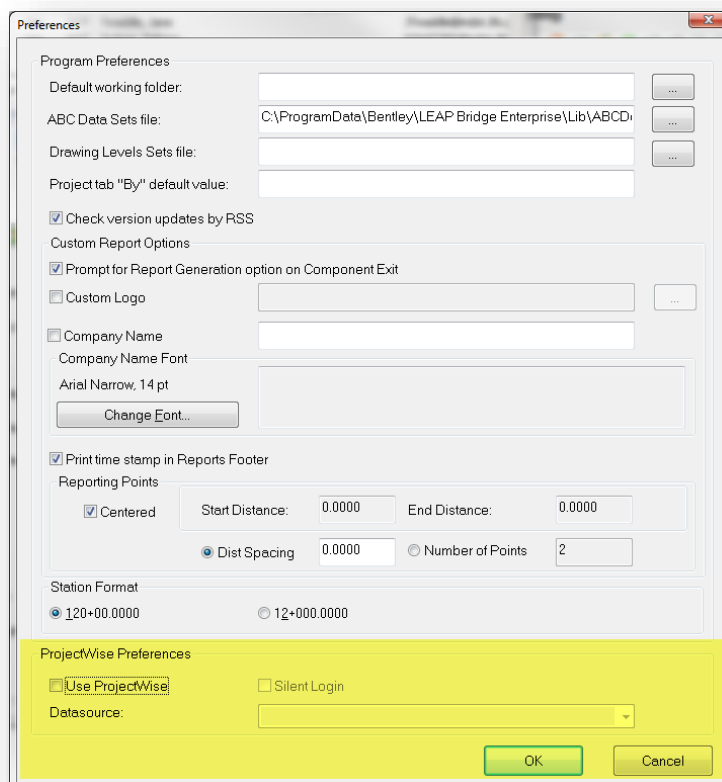
4. Adjust the settings in this section as shown. In the event DOTWise is not available in the Datasource dropdown, it should be typed in manually. Select OK to complete the process.
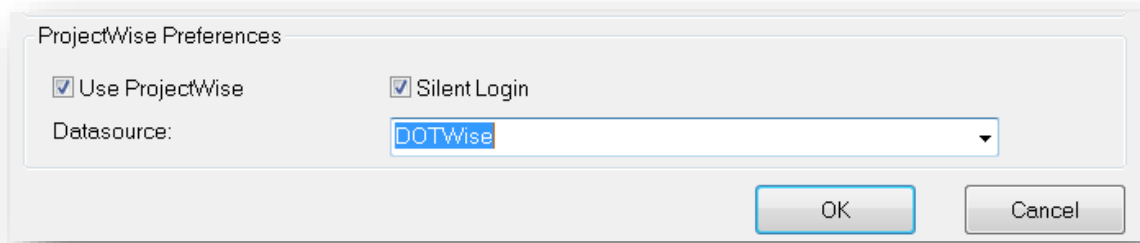


5. At this time, the ProjectWise toolbar will become active (until active the icons will be gray). The functions of this toolbar are discussed in the next section.

### 2.16-2 LEAP Products ProjectWise Toolbars

The toolbar discussed in this section appears in all the LEAP Bridge Modules except Geomath and Consys. It becomes active once ProjectWise integration is enabled.



The buttons are used to perform the following functions and should be used for all file management functions when working with LEAP products in ProjectWise. Please note that for initially placing files into ProjectWise, Drag and Drop is a viable option however further document functions must be performed from the listed tools.

- Add – This will add the currently open document into ProjectWise.
- Open – This will open a ProjectWise Open dialog allowing navigation to and opening of LEAP files from ProjectWise.
- Update – This takes the currently open document and updates the copy located on the ProjectWise server
- Properties – This opens the ProjectWise document properties window.

This toolbar is available in all LEAP products except Geomath and Consys. The function in each application is exactly the same. When performing the Add function from the individual apps, one will be able to save the files in their native formats; in the case of a fully-integrated LEAP Bridge project, all changes should be saved back to the LEAP Bridge Model and then added/updated from there.

As noted, this toolbar is not available in Geomath, but the same functions may be accessed from the *File > ProjectWise* menu option.

## 2.17    The ProjectWise Managed Workspace

The Managed Workspace is a feature of ProjectWise that allows MicroStation workspace files to be managed within the ProjectWise environment.  Benefits of doing this are that all workspace files are located and administered in a single location.  This allows for the rapid deployment of updates and changes; while allowing flexibility in what and how workspace resources are accessed.

Like the plotting resources (such as pen tables, design scripts and settings files); the managed workspace will take the place of X:\ drive locations for CAD resources.  Eventually the X:\ drive will disappear.

As this is just a location change for the workspace, end user impact should be minimal; and with few exceptions, no changes should be particularly evident.

### 2.17-1  Managed Workspace Export

The managed workspace attaches itself to any document opened by a MicroStation based application (MicroStation, Bentley View, Redline, etc.) from within ProjectWise.  In particular, you can expect the managed workspace to be active when viewing/editing DGNs, DWGs, DXFs or any other file ProjectWise opens with MicroStation.

After the workspace has been enabled for your account, you will see the following dialog when opening CAD files from DOTWise:
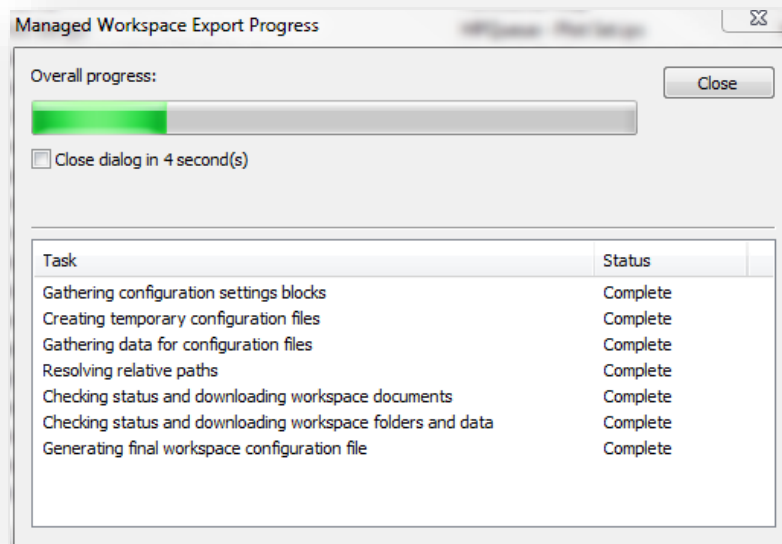


**Managed Workspace Export Dialog**

This is the Managed Workspace Export Progress dialog, and it shows the status of ProjectWise placing the workspace in your working folders.  The first time you open a CAD file after the workspace has been initialized, this dialog will take a short amount of time to download all the relevant files and configure your workstation for the first time.

Subsequent file opens will reduce the amount of time required for the export to complete as once the files have been downloaded, ProjectWise will only update them if there's been a change at the server.  This ensures that you always have the most up to date workspace files available.

### 2.17-2  Working with the workspace

Day to day use of the workspace has not changed in a visible manner.  All tool boxes, macros, and symbology resources have been updated to automatically be available when you access your files.  Areas where you may see differences are in the file paths where items such as cells are being attached from, or where you're initially directed to attach other resources.

Cells in particular are a load on demand resource for the workspace.  They are not copied out the first time you run the workspace, but are loaded when you access their icon in the toolbox.  At this time, you may see a slight hesitation as ProjectWise is downloading the appropriate file to your PC.  After this initial install, it will load instantly unless there's been a change to the file that causes it to be re-downloaded.

### 2.17-3  INDOT Customized Fonts

With the release of MicroStation V8i, Bentley no longer provides a method of maintaining and further customizing font resources files.  Due to this limitation the decision has been made to discontinue the use of the INDOT customized fonts and instead move to using true type fonts only.  These benefits of this method are that files will seamlessly translate between CAD packages and this will prevent the various other issues such as text rendering improperly or with the wrong character set.

As such, the Office of Standards and Policy has provided CAD tech notes on how the special character cells that have been instituted as their replacement should be used in conjunction with the True Type fonts.

### 2.17-4  MicroStation and Files with SignCAD Fonts

With the removal of the legacy INDOT font resource file, the managed workspace is now configured to have the SignCAD fonts available on every project as there's no longer a conflict with existing resources.

### 2.17-5  MicroStation, File -> Open and Workspace Reloads

When opening files from the File -> Open command in MicroStation, you may be prompted with the following dialog:
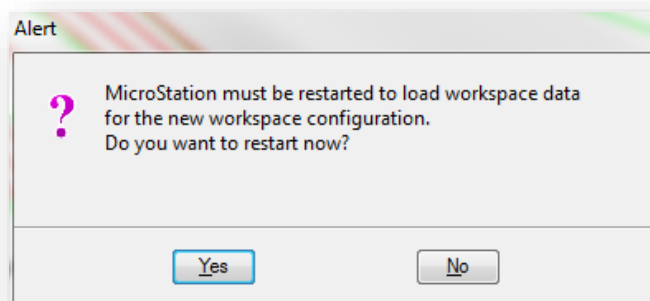
**Managed Workspace Prompt when Switching Files**

This dialog denotes that there's a difference between the workspace you currently have loaded and the workspace options for the file you're attempting to open. When this message appears, the user needs to exit MicroStation and check the current document in, then open the next document from ProjectWise to cause the workspace to be reloaded with the appropriate resources. Alternatively, the user can select *Yes* and MicroStation will close and reopen immediately with the new workspace loaded. Due to how the workspace is attached to your account, you will see this message when changing files from either the recent files list or by using File -> Open.

If you select No on this dialog, MicroStation will continue to function with the existing workspace features loaded, which may not include the resources you're looking for such as the SignCAD fonts.

### 2.17-6  Local Document Organizer

As the managed workspace copies files to your local machine, ProjectWise will allow you to manage these through the Local Document Organizer. It's highly recommended that you not remove the workspace documents from your PC unless directed by CAD Support. ProjectWise will handle the updating and export of documents "as needed" behind the scenes to provide a seamless experience.

If you do purge these files, the first time you open a CAD file, ProjectWise will re-download the workspace, providing a slight delay similar to the first time it's used.

Should CAD Support request you purge your workspace copies, go to the Local Document Organizer (Tools -> Local Document Organizer... from the ProjectWise Explorer menu). On the Local Document Organizer tab, select the button for Workspace Copies as shown:
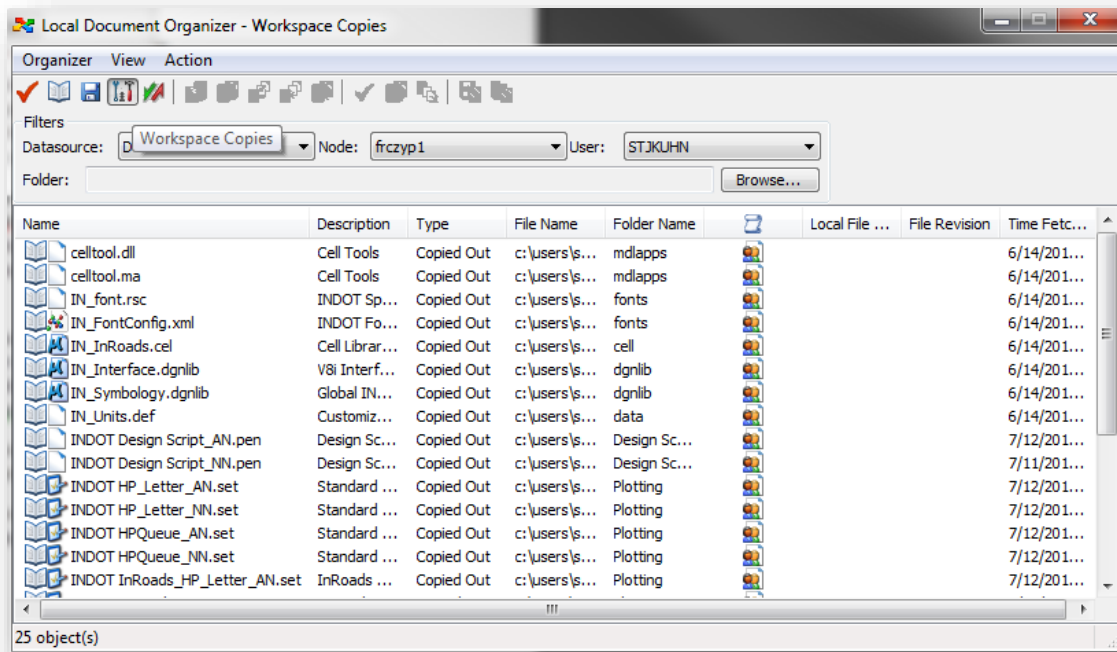
This window functions similarly to the Copies option, in that you can only Purge or Refresh these documents.  Check out will be unavailable as these are administered by the CAD Support staff.  Should they request you purge your workspace copies, select all entries in this window and either right-click and select Purge Copy or perform the same option from the Action menu.

## 2.18    Document Archival and Audit Process

### 2.18-1  Introduction

With the rollout of DOTWise 3.5, the process of sending documents from ProjectWise to ERMS has been put in place and is now available for use.  The following document looks at the requirements for setting up Design documents on the ProjectWise side, sending them to ERMS, and then locating them once they've been uploaded.  Also, this material covers the process of preparing your project for archiving for future use.

Please note that the information in this document only applies to projects created after the Spring (March) 2014 release.  Projects created prior to this date will not have the appropriate metadata frameworks and will not function properly with the processes discussed.  If there are any questions, please contact CAD Support via Helpdesk Ticket with your Des. No.

### 2.18-2  Sending Documents to ERMS and Preparing for Archiving and Design Workflow

#### 2.18-2a    Document Naming

A critical step in the transferring of documents from ProjectWise to ERMS is that they are properly named according to the Project File Naming Conventions sheet (link provided in section 3).  In order for them to be placed in the proper workflow in ERMS and in order to locate them using search tools for later recovery they must be named using these naming conventions.

#### 2.18-2b    ProjectWise Enhancements Required for ProjectWise to ERMS Transfers

In the DOTWise 3.4 release, the INDOT ProjectWise structure underwent a major overhaul to enable the following functions which are key to the document transfer process:

- All disciplines have a Project Type
- All disciplines have a Workflow & State configuration
- All disciplines have an Environment structure
- All Project Types are keyed to the project Designation Number
- All Environments have Properties for:
    - Designation Number
    - ERMS/UCM Document Type
    - The last date the document was sent to ERMS/UCM
    - The last state the document was in when sent to ERMS/UCM
    - The last user to send the document to ERMS/UCM

The next section will discuss how these enhancements are used in conjunction to send a document from ProjectWise to ERMS.

### 2.18-2c    Transferring Documents from ProjectWise to ERMS

As part of the DOTWise 3.5 release, all ProjectWise users within INDOT have been provided a new extension that appears in the ProjectWise Documents menu and right click context menu.
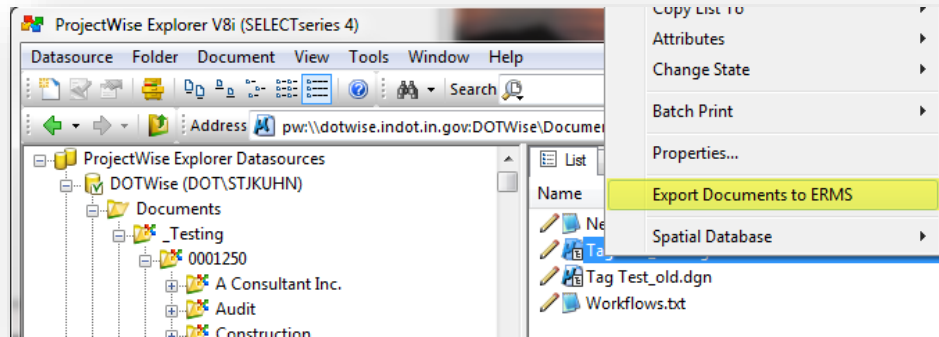


**The Export Documents to ERMS Menu**

This menu item is toward the bottom of the documents menu, and will only appear on documents.  It will not function when selecting document sets, folders, or projects.

The following steps *are required* when sending a document from ProjectWise to ERMS:

1. Locate the document to be sent in ProjectWise (under the Des No -> Discipline folder).
2. Right-click and select Properties command and make sure all applicable Project and Environment data is filled out.
   a. The Discipline Project folder (ex. Design).  Ensure as much information as possible is filled out as permissions allow.  The Des. No. is required (pre-populated by SPMS) and the other fields should be filled out accordingly.  Focus on the last 4 fields, these properties will help determine where in the ERMS Design workflow the document will be placed.
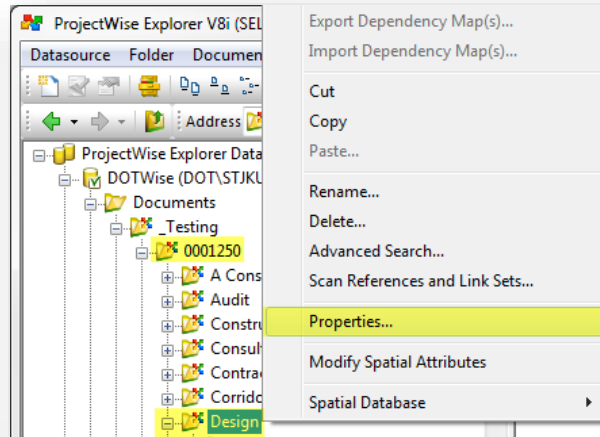
**Project Property Checks**
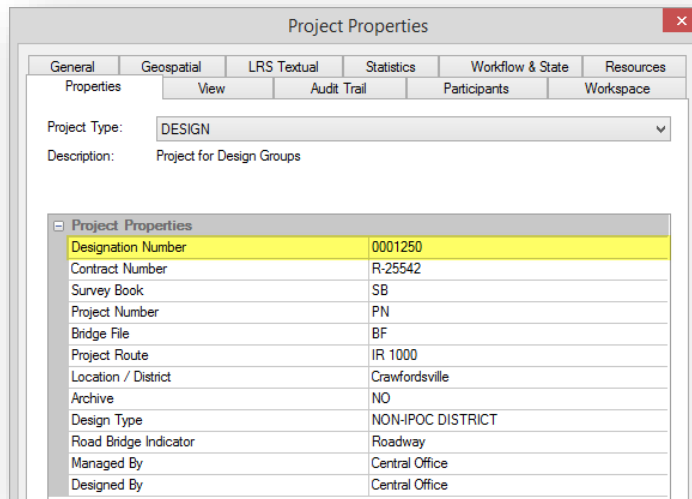


**Required – Designation Number**

b.  Look at the document properties with the **_PROJECT INFORMATION interface active**. (By right-clicking and selecting the properties command from the selected document).  Fill out as many document properties as possible on both the Attributes and More Attributes panels.  The *ERMS Document Type is required* and corresponds to the available document types when manually uploading a document to ERMS.
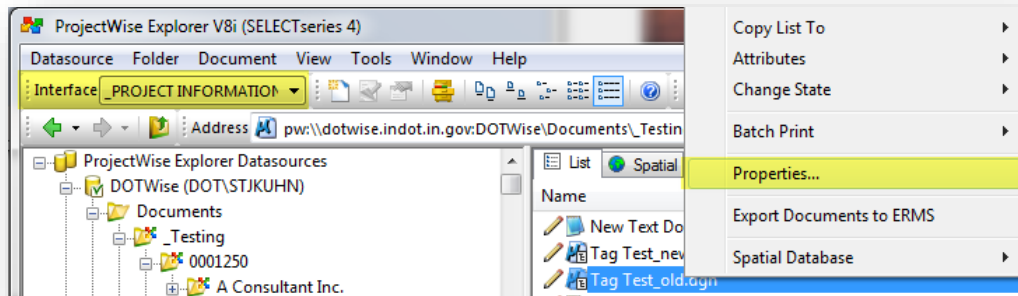
**The _PROJECT INFORMATION Interface and Document Properties**
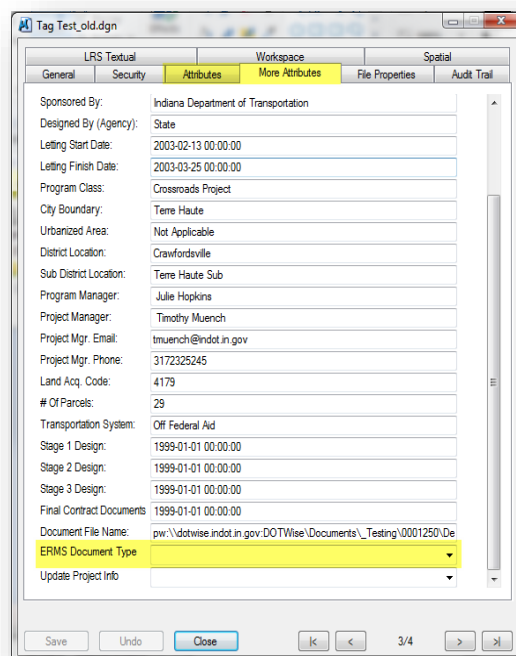


**Attributes, More Attributes and ERMS Document Type**

3.  Next, set the appropriate document state from the Document's parent folder properties Workflow & State tab.  These states also correspond with those required when manually uploading files to ERMS.  To change a document state, select it in the Workflow & State tab and use the up/down arrows on the upper right to change the state.  This can also be accomplished by right clicking on the document in the ProjectWise Explorer and Selecting the Change State entry and it's sub options Next, Previous, or Change.
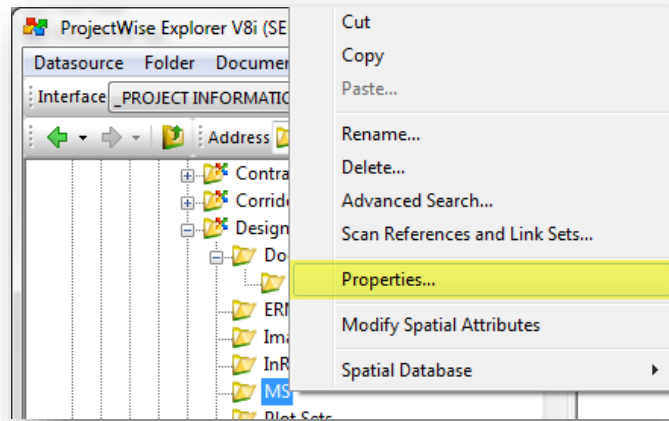
**Folder Properties**
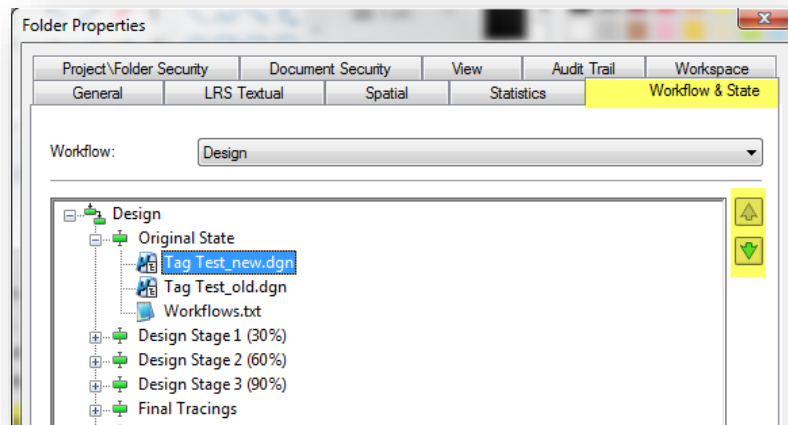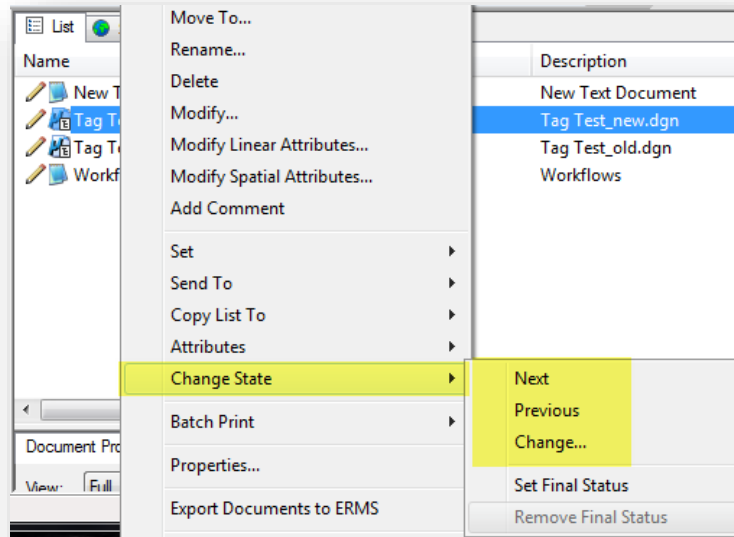


**Workflow & State**

**Workflow & State on a Document**

4. With all the appropriate information filled out at the Project, Environment and Workflow & State levels, it's now possible to send the document to ERMS.  In the Document window, right click on the document(s) that are ready to transfer, and select the *Export Documents to ERMS* option.
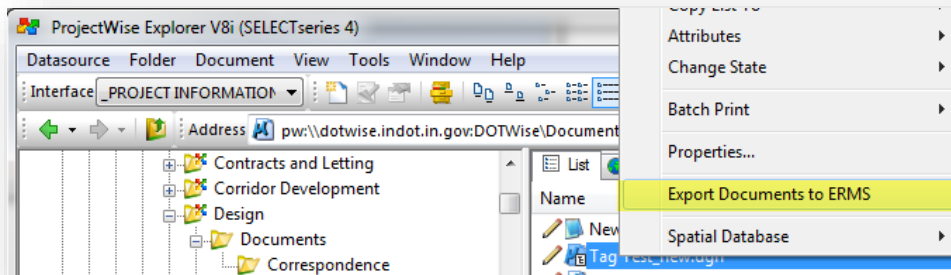


**Export Documents to ERMS**

5. Selecting the menu will cause a brief to occur where the selected documents are queued to be transferred into ERMS.  At the conclusion of this process, the selected documents will show that the admin user is the last user listed in the Update By column.  This is due to how the process updates the date, user, and state the document was sent.

**The Updated By User (Post Queuing)**

6. To inspect the upload information, change the ProjectWise Interface to ERMS Upload, and perform a properties on one of the sent documents. Change the tab to More Attributes. The Last Sent By, On, and State have all now been populated. **(Refresh – F5)**
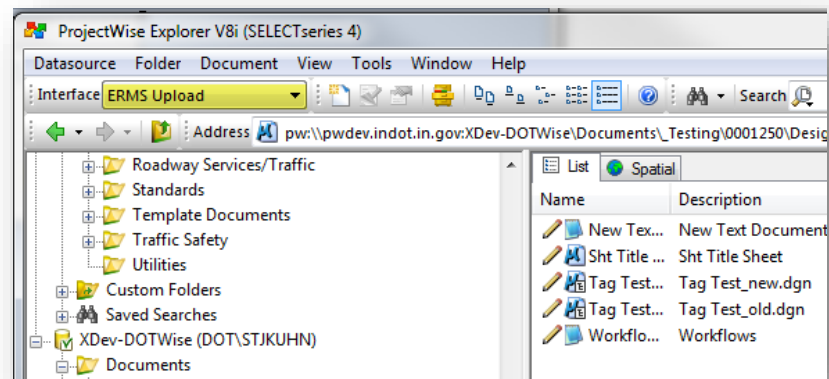


**The ERMS Upload Interface**
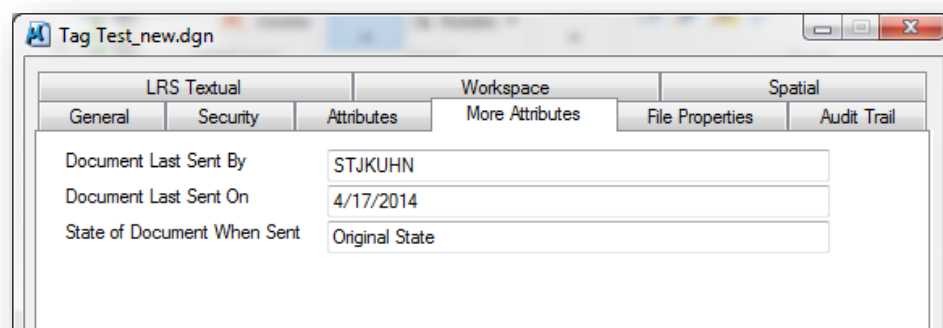


**The ERMS Upload More Attributes**

7. At this time, the selected documents have been queued to be sent to ERMS. As this is a scheduled process, the documents may not be immediately available in ERMS, and care should be taken when making further modifications. Due to potential delays in processing,

documents should not be edited in ProjectWise until they are verified to be in ERMS in the correct workflow and with their complete metadata.

**\* When .dgn's are selected to be moved to ERMS any associated reference files will also be exported and moved to ERMS.**

### 2.18-3 Other methods of Preparing and Sending Documents

In addition to the single file method demonstrated in the previous section, the ProjectWise to ERMS tool also accommodates the sending of multiple files at once as long as all the appropriate data is applied to the files.  The two methods that will be discussed in this section are the usage of Advanced Searches and Document Sets to collect your files.

#### *2.18-3a     Collecting Multiple Documents to send to ERMS/UCM using an Advanced Search*

1. Using advanced searches is a good way to locate multiple files to send to ERMS.
2. Right click on the folder that contains the documents you wish search for.
3. The Right click menu will appear (select Advanced Search) as shown below:
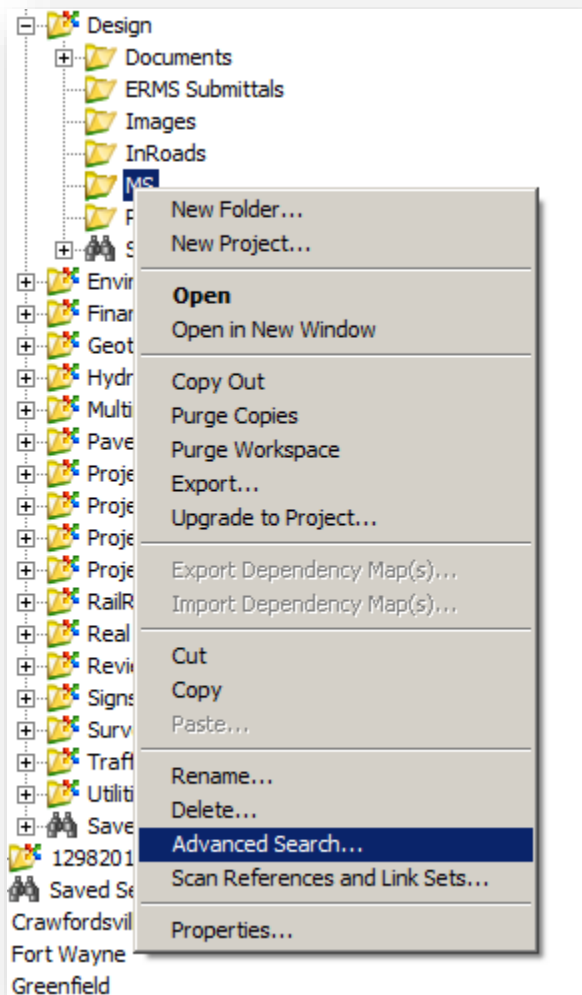
4. The Select Search Definition Dialog box will appear, giving you the option to Search Form or Search Builder.  Select the Search Form option as shown below:
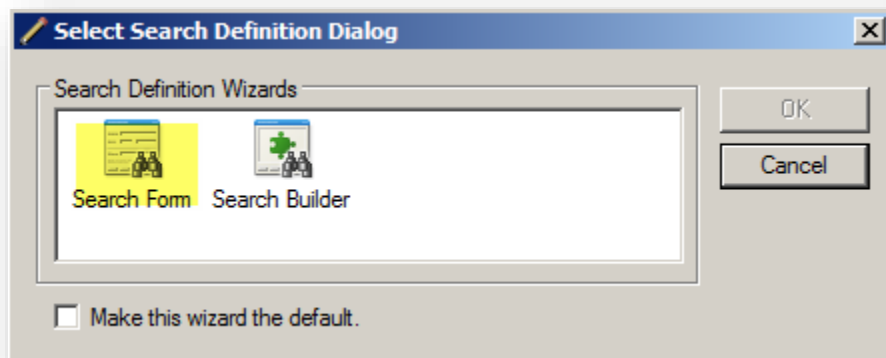


5. Once Select, click the OK button to the right
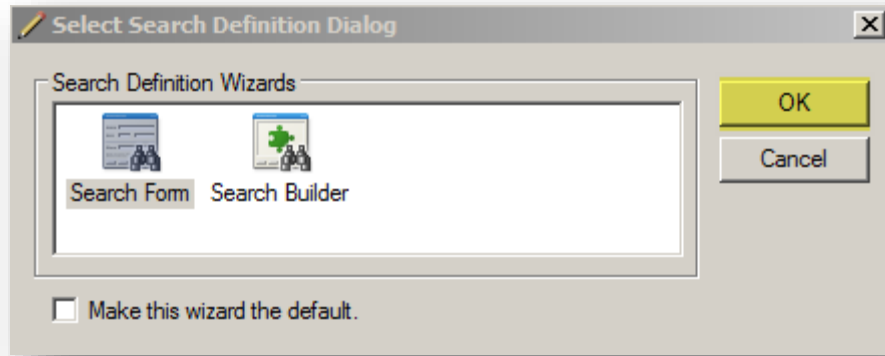
6. Once you have clicked the OK button, the Search by Form dialog will appear on the screen. Next, select the Sate Pull down. In the Sate Pull down, select the stage of Audit you are searching for shown below:
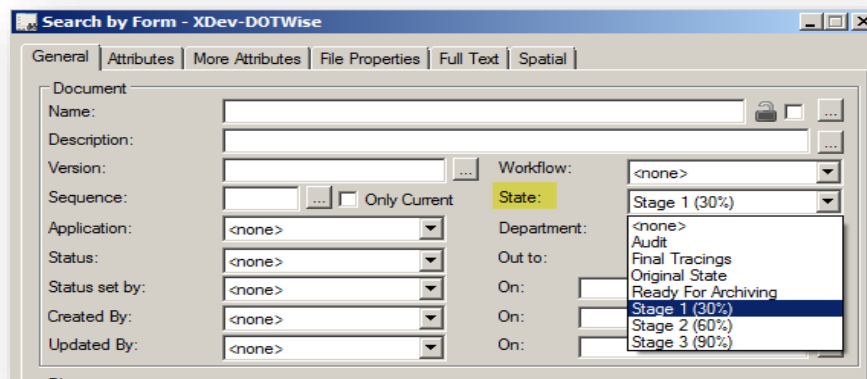


7. Select the OK button at the button of the dialog box. *Remember this is just one example of a search on Stage 1 documents. Your search can be as advanced as you choose to make it.*

You can save your search criteria and use it again later.

8. The results screen will appear with the results of your search



9. Each of the files properties are now available to you, be sure to fill in all the required attributes related to them before exporting to ERMS.

10. Select each file and check the More Attributes tab and ensure the ERMS Document Type has been selected (As shown below) – **can be arrowed through each file.**

11. You can then select the files you wish to export to ERMS/UCM.
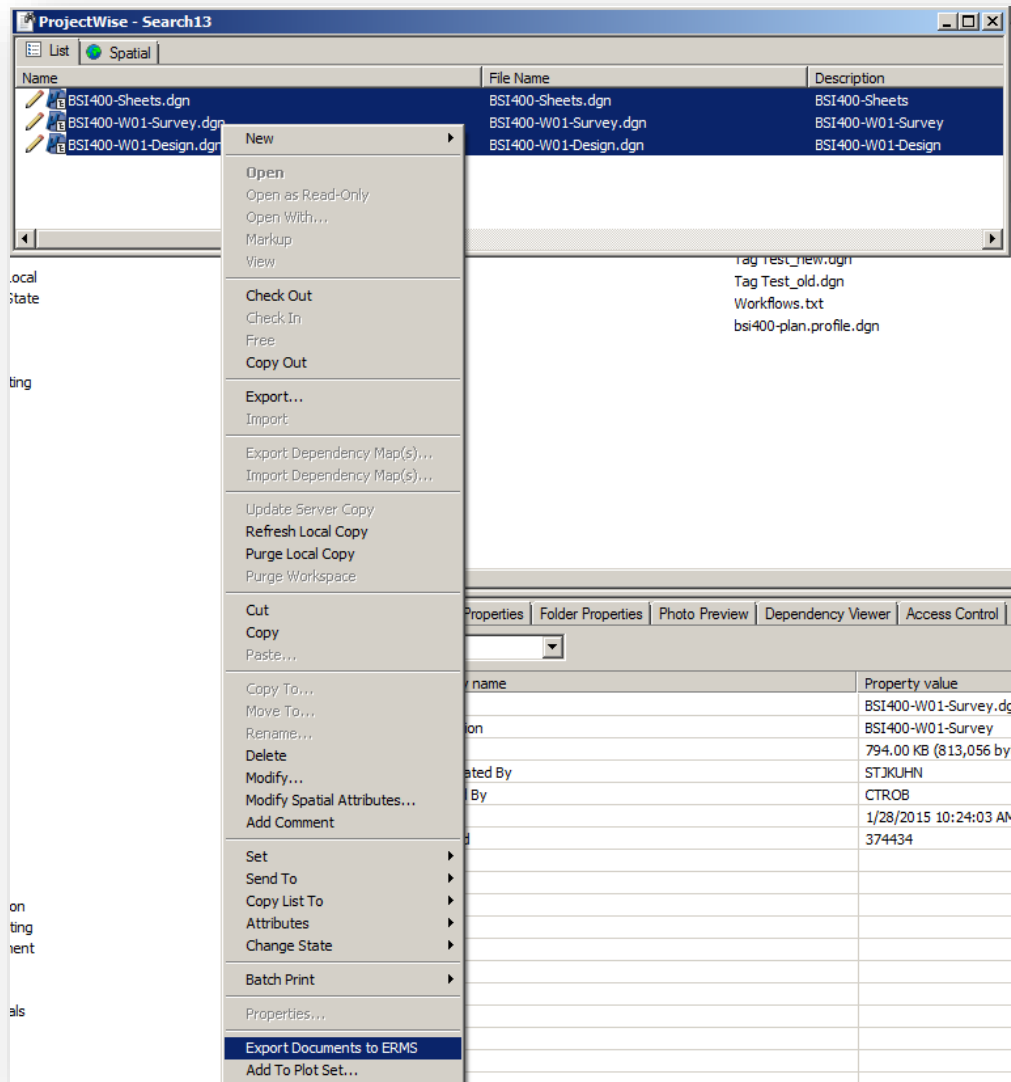


12. You will right click once you have selected the files and will then scroll down to the bottom of the pop-up menu and select Export Documents to ERMS. The screen will flash a brief second as the export is being completed.

**Depending on the frequency with which you may need to use these searches, please keep in mind that you can save them and use them repeatedly for your project.**

## 2.18-3b    Collecting Multiple Documents to send to ERMS/UCM using a Document Set

A document set is a grouping of documents. A document set can either be a flat set, which is just a collection of documents that are grouped together but with no physical connection to each other, or a logical set, which is any document in ProjectWise that has other documents referenced into it.

1. To create a Document set in order to send multiple files to ERMS, follow these instructions.
2. Under the Discipline (i.e. Design, Survey) folder and sub-folder containing the files you wish to export, simply shift->select the files (**Be sure to check attributes for these files and make sure ERMS Document type have been set for all files**) you want in the Document set as shown below:
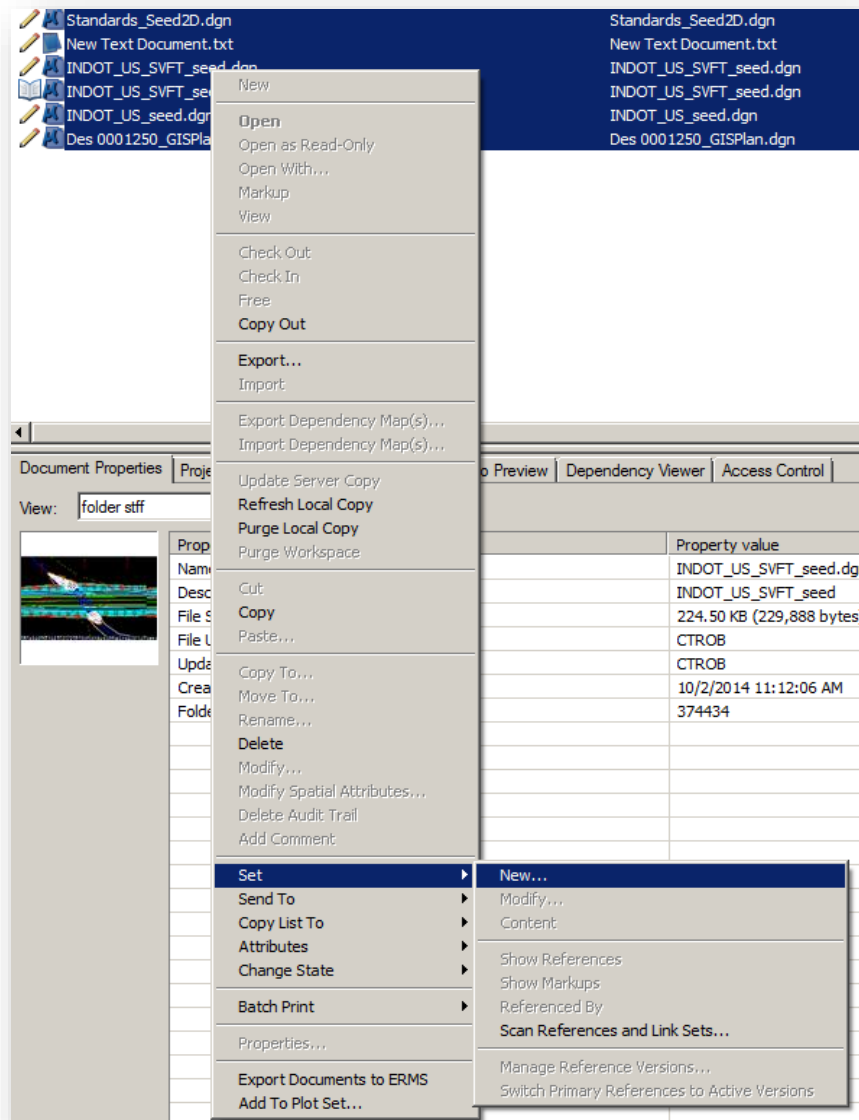


3. A pop-up menu will appear, and you will scroll down and select Set New.

4. You will then give the Document set and appropriate name. Then click the OK button
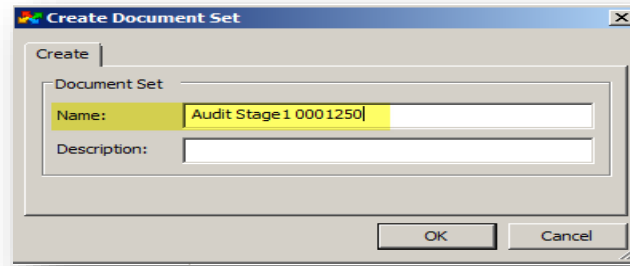


5. Once selected a box will pop up with the Document Set files in it as shown below:
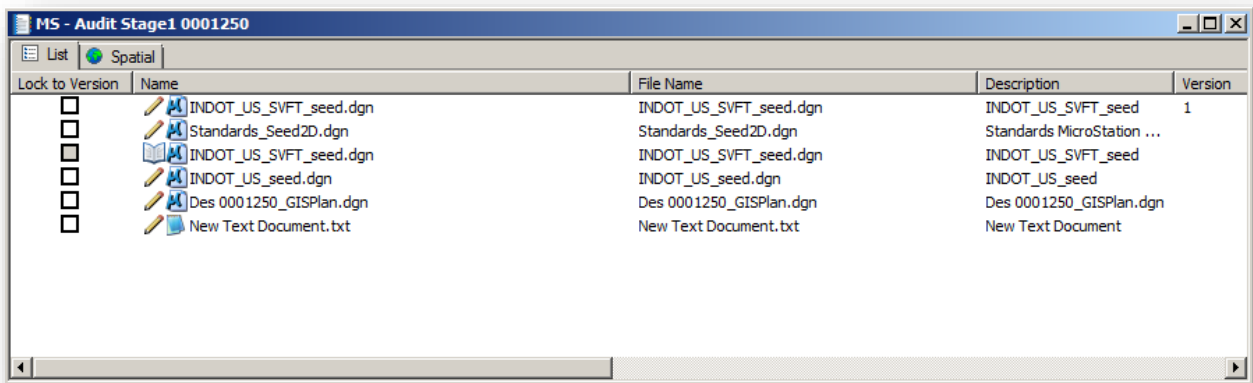


6. Once again ensure document type is set in the More Attributes tab for all the files. You can then close the dialog box.

7. With the document set open, select the files you're prepared to send and right click and scroll to the Export Documents to ERMS command.  The screen will flicker as the files are being exported.
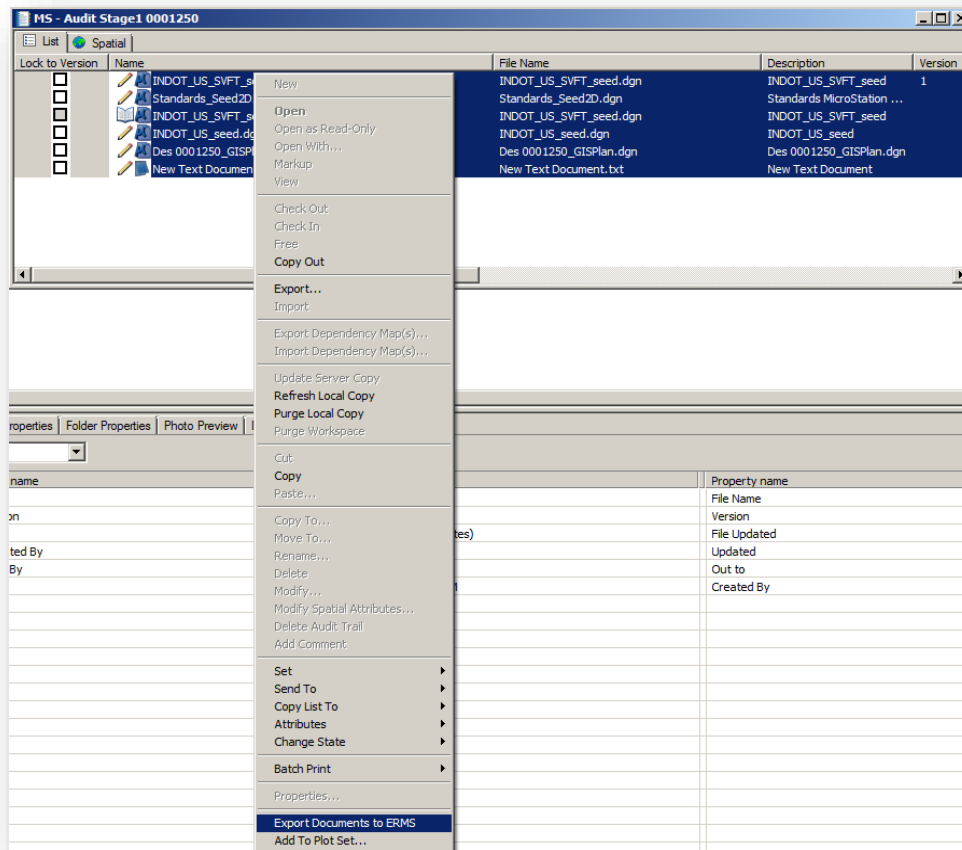


### 2.18-4  Archiving Projects from ProjectWise to ERMS/UCM

As with the Audit and Export to ERMS processes shown in the previous sections, we have created tools to allow for the archiving of completed projects from ProjectWise and the transfer of those projects/files to ERMS.

This archiving procedure is a two step process and there's two major responsibilities needed for the successful archiving of a project:

1. Each discipline is required to flag their own relevant documents being the subject matter experts.  At the conclusion of each disciplines project responsibilities, the relevant parties will need to perform their archival steps.
2. The Project Manager will be responsible for ensuring that each discipline has flagged the appropriate documentation prior to initiating the full project archive process.

#### 2.18-4a     Per Discipline setting a project (Ready for Archiving) Workflow and State

The first portion of the project archiving tools are discussed in this section.  The following are the steps that members of each discipline are responsible for during their project development process

and these can be performed at any relevant time during the project process.  Note that these steps do share some common features with the other steps in sending documents from ProjectWise to UCM, particularly the usage of Workflows and States.

There are two methods within ProjectWise for setting the State of a file to Ready for Archiving.  We want all users to understand that there is no need to archive all files within a project.  We only want files that are necessary (i.e. no working or draft copies).

1. The first method is started by right clicking the folder containing the files within a discipline (see image below of MS folder under Design)
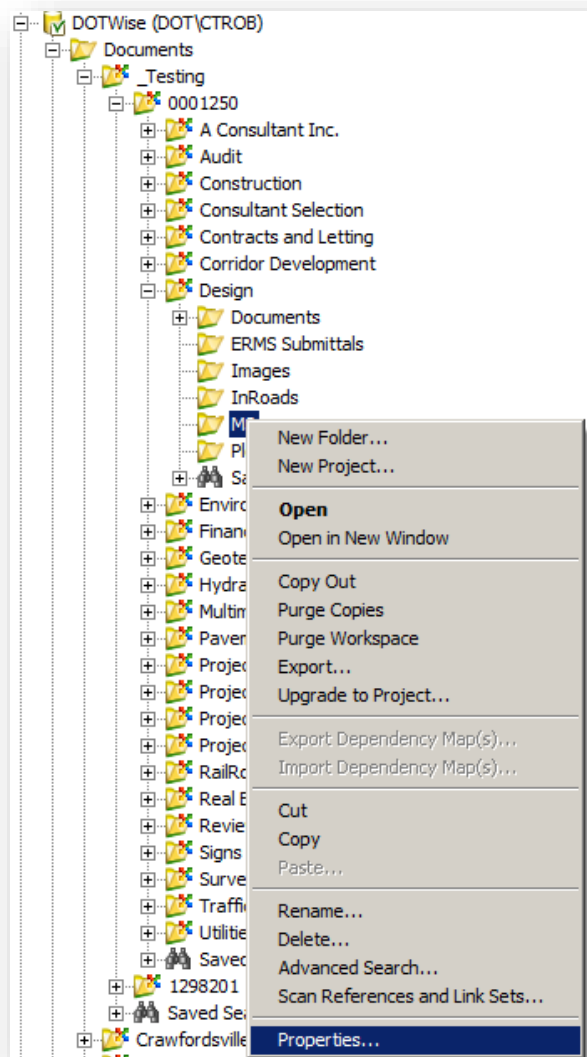
2.  Once the Properties dialog is selected it will appear on the screen and you will select the Workflow and State tab

**\* When .dgn's are selected to be moved to ERMS any associated reference files will also be exported and moved to ERMS.**
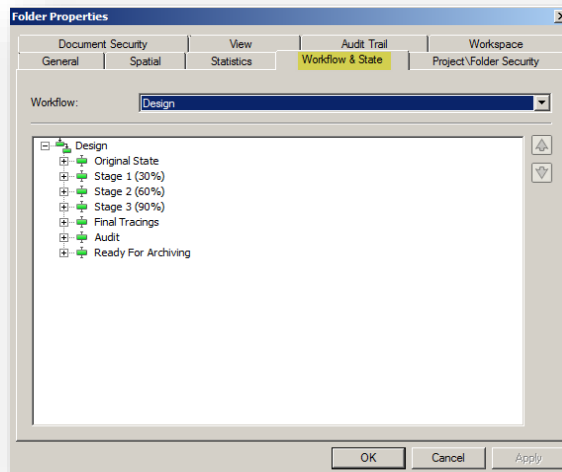


3.  By opening the various states, you will be able to see what files are currently in what state. You will from this window be able to move a file from its current state to the state of Ready for Archiving.  You select the file (it will highlight) and you then select the green arrow to the right and click the arrow until the files moves to the next state.  Note that multiple files can be selected in this step through the use of Ctrl+Click or Shift+Click selection methods.
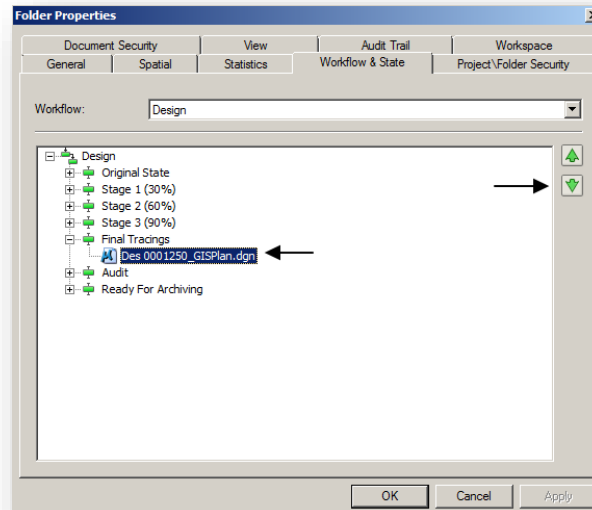
4.  Once the file/files have been transitioned to the Ready for Archiving State, you will select the OK button at the bottom of the dialog.
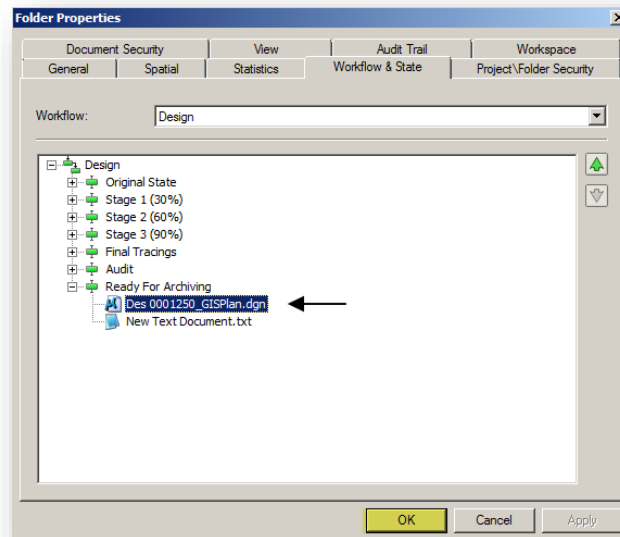


5.  The second method is to individually select the files from the folder by right clicking and selecting the Change State -> Change Command
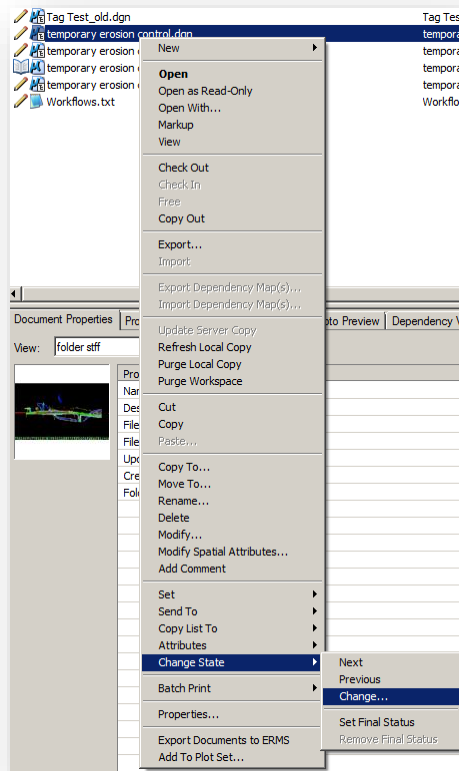
6.  This will bring up the Change Workflow State dialog box (it will show the selected file you have chosen in its current state).  You click (as many times as needed) the green arrow to the right and move the file to the Ready for Archiving state.
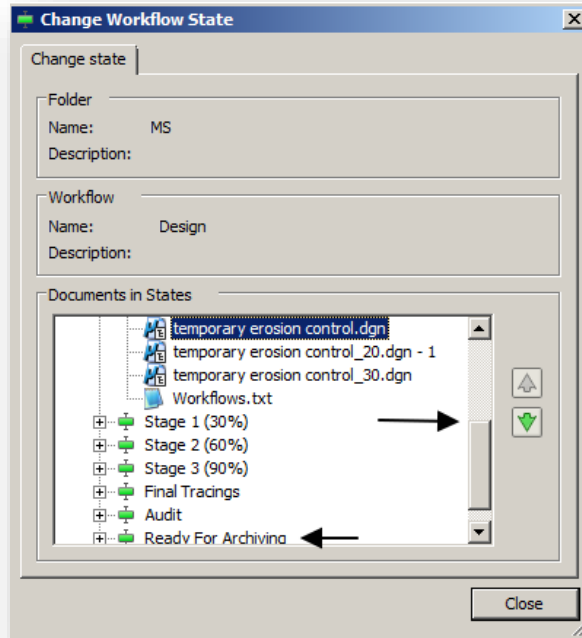


7.  Once moved to the Ready for Archiving State select the Close button.
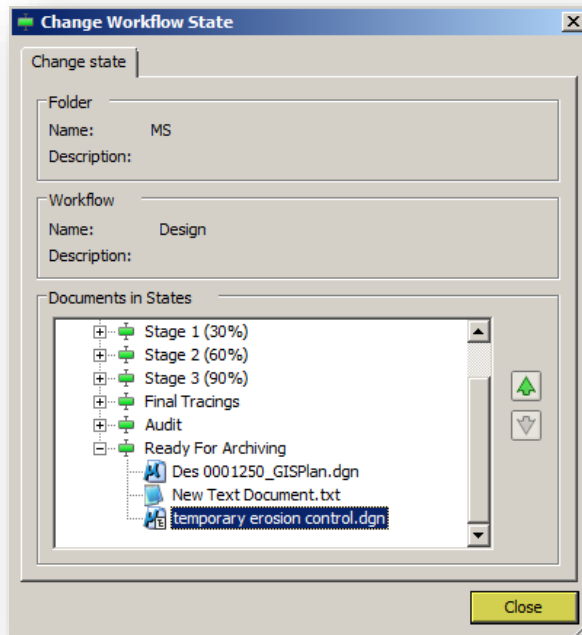
With the appropriate documents in the Ready for Archiving state, this portion of the archival process is complete. The complimentary portion of the process where the PM sends the entire project will be completed at the appropriate milestone at which time the data will be sent to ERMS. Until that time, the project data will continue to reside in ProjectWise for all users.

### 2.18-5 PM project management of ProjectWise projects to flag Archive – YES

Throughout the development of a project, each discipline will complete their steps as shown in the previous section. Once all disciplines have prepared their portions of the project, the Project Manager can then flag the full project for archiving. Please note that considerations should be made if the project is undergoing continuing mitigation studies.

1. As Project Manager of a Des No. project in ProjectWise it is expected that the Final Status for moving the project to ERMS/UCM will be determined by you. It will be your responsibility to check SPMS and with the disciplines prior to setting the property Archive to YES. This is done as shown in the follow screen shot by going to the properties tab of the Project.
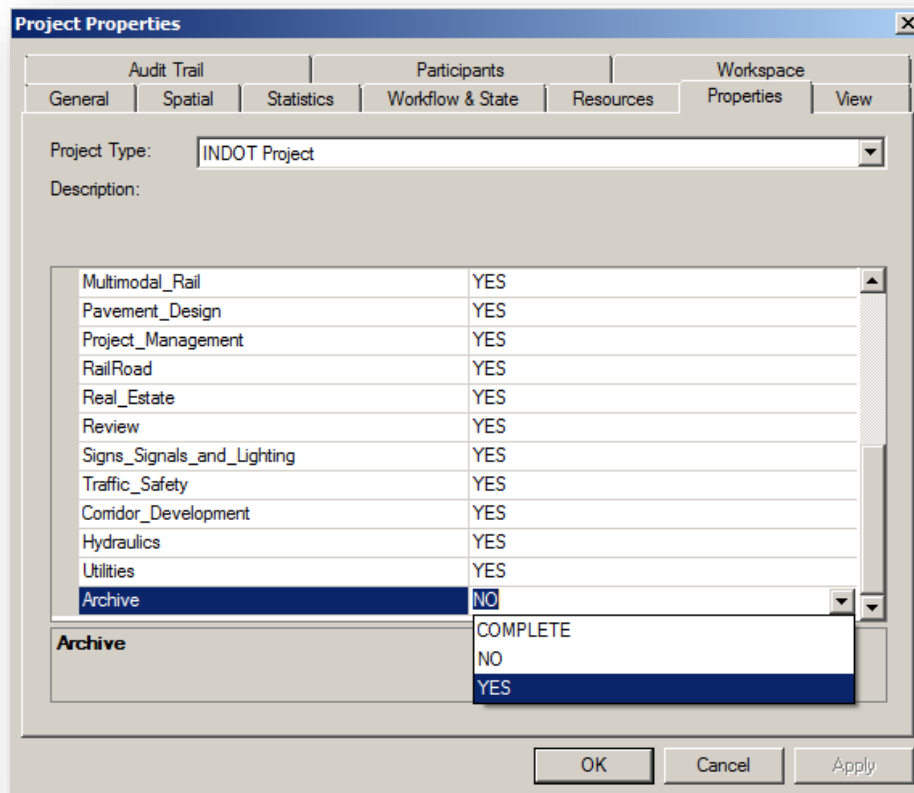


When this status is checked the tool developed to move the files to ERMS will see the property and move the files from ProjectWise (they will then disappear from your datasource view). This process is not instantaneous, and the project may continue to be viewable for a day after the archiving has been requested. This is due to the scheduled nature of the process and care should be made to not modify documents after the project has been set to Archive: YES.

# 3.    MicroStation and V8i Interface

## 3.1    What's New in MicroStation V8i

Since our last DOTWise document/training we have changed versions of MicroStation and have transitioned from MicroStation XM to MicroStation V8i SS2.  With that transition MicroStation has taken on a few interface changes and added a few new tools along with deleting a few and even changed how some of them function.  Our goal in this chapter is to provide you with a guide to those changes.

### 3.1-1    Application Window Layout Changes

The default application window layout in this edition differs from the XM Edition in the following ways:

The *Tasks dialog* is the default task navigation interface. This dialog is docked to left-hand edge of the application window.

The Main task is embedded in the Tasks dialog.
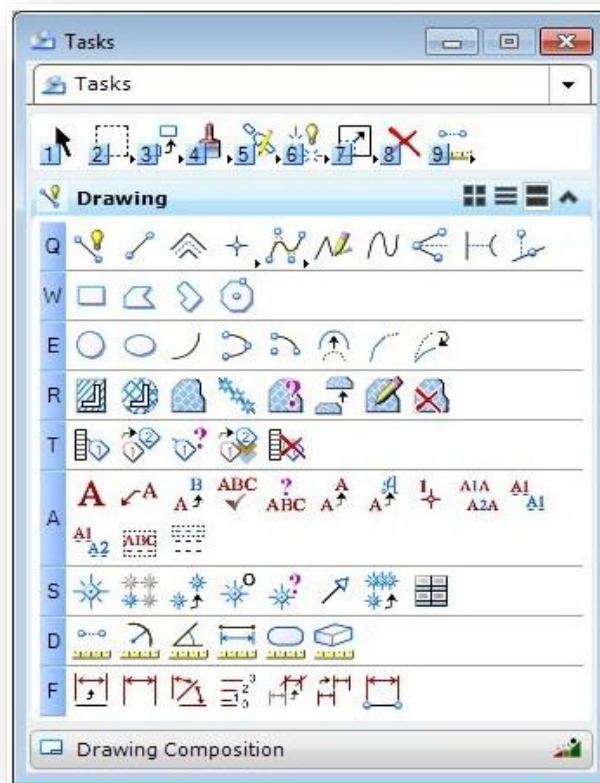


Task Navigation

### 3.1-2    Tasks dialog

Used to view the Task List and to select the tasks, workflows, and tools with which you need to work.

The size of the icons in the Tasks dialog is set in the Preferences dialog. You also can choose to show or hide Navigation icons. In the default setup, tools from the Main toolbox have been integrated into the Tasks dialog in a Main task.



The Drawing Task

You can *dock* the Tasks dialog to the left or right edge of the application window. By default the Tasks dialog is docked to the left edge of the application window, and the active task is the Drawing task.

You can resize, minimize, dock, undock, open, and close the Tasks dialog. You can open a workflow in a separate instance of the Tasks dialog.

If you have position mapping turned on, the keys are displayed next to the tools in the Tasks dialog. When the position mapping keys have focus, they appear on a dark background. When they do not have focus, they appear on a light background.

If you hide tools while viewing tasks in the Tasks toolbox or in views, these tools will be hidden in the Tasks dialog.

### *3.1-2a     Main toolbox*

The Main task is used to select general usage element selection, manipulation, and modification tools.

The Main task, containing tools from the Main toolbox, is open when you start the program for the first time. By default, tools from the Main toolbox appear as a Main task in the Tasks dialog, which is docked to the left-hand edge of the application window. The Tasks dialog can be undocked or docked to the right-hand edge. Right-clicking in the Main task and selecting Open 'Main' as Toolbox opens the toolbox as a floating toolbox.
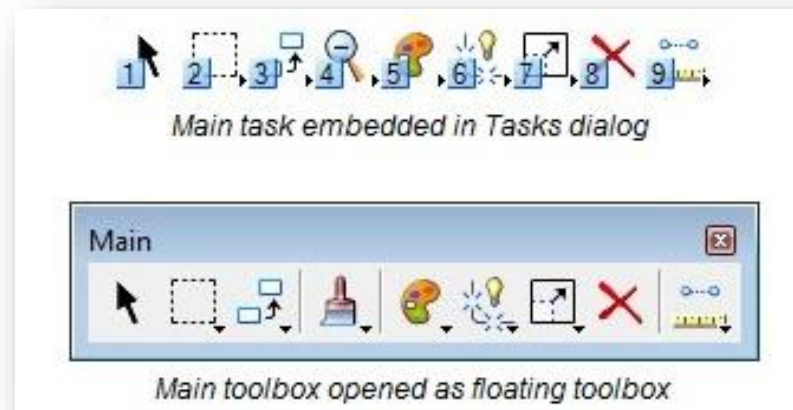


### 3.1-3   Dockable Dialogs

To gain more screen space, there are many dialogs that you can dock to the edges of the MicroStation application window.

### *3.1-3a     To dock a dockable dialog*

1. Select a dockable dialog's title bar.
2. Drag the dialog over one of the docking indicators that appear in the center of the screen or along the edges of the application window.



The docking indicator for the top docking region

3. As soon as you begin to drag a dockable dialog, a transparent block representing the dialog is attached to your pointer, and moves with the pointer until you release the mouse button.
4. Place the pointer over one of the docking indicators.  This highlights the available docking region along the corresponding edge of the application window.
5. Release the mouse button.  The dialog is docked within the selected docking region, and is displayed in its entirety.

### 3.1-3b    To turn on Auto Hide for a docked dialog

1. Dock a dockable dialog to an edge of the application window.
2. Click the Auto Hide (pushpin) icon in the upper-right corner of the docked dialog.  The docked dialog disappears from view, and a roll-out tab appears in its place along the same edge of the application window.



The Auto Hide (pushpin) icon

Roll-out tabs for dialogs docked to left side of application window

### 3.1-3c    To turn off Auto Hide for a docked dialog

1. Place the pointer over a docked dialog's roll-out tab.
2. While the dialog is displayed, click the Auto Hide icon.  The dialog is re-docked along the same edge of the application window.



The Auto Hide (pushpin) icon

### 3.1-3d    To undock or float a docked dialog

Double-click the title bar of a docked dialog. The dialog returns to the position in which it was last floating.

### 3.1-3e     To re-dock a floating dockable dialog

Double-click the title bar of a floating dockable dialog which has been docked at least once. The dialog returns to the location where it was last docked.

### 3.1-3f     To close a docked dialog

If the dialog is docked, simply click the dialog's Cancel icon (next to the Auto Hide icon). If Auto Hide is enabled, first pause the pointer over a docked dialog's roll-out tab, then while the dialog is displayed, click the dialog's Cancel icon, or Simply enter the key-in that is normally used to close the dialog.

If you close a dialog while it is docked, and later click the icon or enter the key-in that normally opens the dialog, the dialog will open again to the position it was last docked.

If a dialog is docked when MicroStation exits it will be docked in the same position the next time you start the product.

### 3.1-3g     List of dockable dialogs

The following is the list of dockable dialogs and which edges they can be docked to:

- Tool Settings window (left or right)
- Element Information dialog (left or right)
- Project Explorer dialog (left or right)
- Link Sets dialog (left or right)
- Tasks dialog (left or right)
- Markups dialog (left, right, top, or bottom)
- Item browser (left or right)
- Details dialog (left, right, top, or bottom)
- Feature Manager dialog (left or right)
- References dialog (top or bottom)
- Raster Manager dialog (top or bottom)
- Models dialog (top or bottom)
- Saved Views dialog (top or bottom)
- Level Manager dialog (top or bottom)
- Level Display dialog (left, right, top, or bottom)

The way in which you dock one of these dialogs is different from the way in which you dock a toolbox.

### 3.1-3h     Using Docking Indicators

As you drag a dockable dialog, docking indicators appear on the screen. These docking indicators indicate which edges of the application window the selected dialog can be docked to. In most cases, a dockable dialog can only be docked either horizontally or vertically; however some dialogs, like the Level Display dialog, can be docked both horizontally and vertically.

The center docking indicators
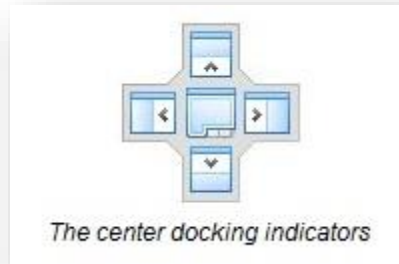
If the selected dialog can be docked horizontally, then the docking indicator at the center of the screen will have arrows that point toward the top and bottom edges of the application window, and matching docking indicators appear along the top and bottom edges. If the selected dialog can be docked vertically, then the docking indicator at the center of the screen will have arrows that point toward the left and right edges of the application window, and matching docking indicators appear along the left and right edges.



The docking indicator for the top docking region
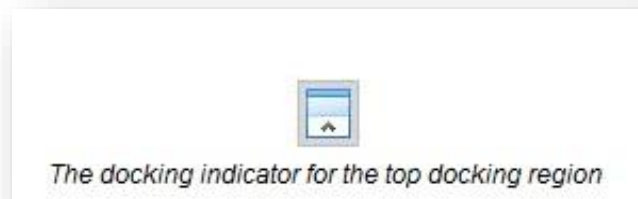
You can release the dialog over any of these arrows, and the dialog will be docked to the corresponding docking region. While it is mostly a matter of preference whether you use the docking indicator at the center of the screen or the ones at the edge of the application window, there is a slight difference in the two.

Using the center docking indicators will position the dialog so that it takes up the remaining free space along the length of the selected edge of the application window. For example, if there is already a dialog that is docked vertically on the left edge of the application window, then dropping a horizontally docking dialog over the center docking indicator, pointing toward the top edge of the application window, will dock the dialog so that it fits in the remaining space along the top edge.

Using the docking indicators at the edges of the application window let you decide where specifically along the selected edge you want to dock the dialog. For example, if there is already a dialog docked to the left edge, you can use the edge docking indicators to select whether you want to dock the new dialog on top of the existing dialog, or to the left or right of it, or above or below it.

If you are moving a dockable dialog and there are no dockable dialogs currently docked to the edge of the application window that the selected dialog can be docked to, then the center controls will not display.

### *3.1-3i Other dialogs that can be docked*

The following dialogs are also dockable; however their docking behavior follows the standard docking behavior for toolboxes:

- Key-in window
- View Groups window
- AccuDraw window
- Drawing Scale window
- Snap Mode button bar

### *3.1-3j Dialogs that are docked by default*

When you start MicroStation for the first time and open a file, certain dockable dialogs are already docked. This is because the product delivers a docking preference file that defines which dialogs are docked by default, and where.  As you make changes to the location of docked dialogs, that information is saved in your personal docking preference file, rather than in the delivered default docking preference file.

### 3.1-4   Tasks

Clicking this task displays all tasks in a hierarchical tree. Clicking a task in the tree expands the task, making it the root task, and hides the other tasks.
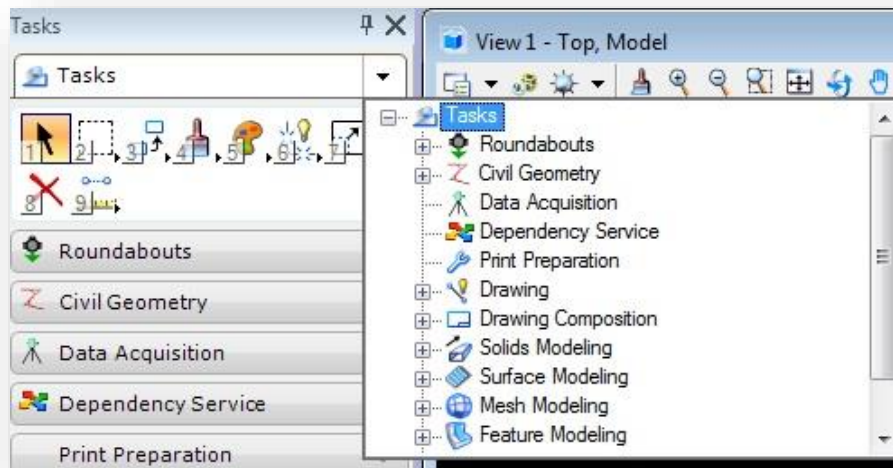


**Task Navigation Flyout Menu**

Once a subordinate task has replaced Tasks as the root task, clicking the task's tab displays all tasks in a hierarchical tree. Clicking Tasks in the tree resets Tasks as the root task.
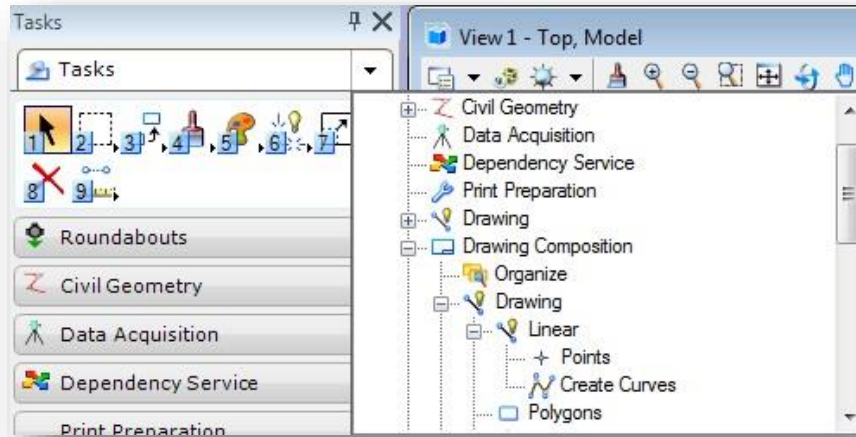
**Any Task can be selected as the Root Task**

### *3.1-4a        Main task tools*

In the default setup, tools from the Main toolbox have been integrated into the Tasks dialog in a Main task. You can hide the Main task tools in the Tasks dialog by clearing the Show Main Task Tools check box in the Task Navigation category of the Preferences dialog. You also can customize the Main task tools.

### *3.1-4b        Task Tabs*

Clicking the down arrow on a task's tab expands the task so you can see the tasks and tools in it. Clicking the up arrow collapses the task and hides them.

You can click the icons on a task's tab to view the tools in one of several layout modes:

- Icon Layout mode
- List Layout mode
- Panel Layout mode (the default)

The icon belonging to the first tool in a task is displayed on the task's tab. You can select a different icon for the task in the Customize dialog.

In the default setup the following tabs are visible:

- Drawing task
- Drawing Composition workflow
- Solids Modeling task (3D only) — contains tools commonly used for solids modeling.
- Surface Modeling task (3D only) — contains tools commonly used for surface modeling.
- Mesh Modeling (3D only) — contains tools commonly used for mesh modeling.
- Feature Modeling task (3D only) — contains tools commonly used for feature modeling.
- Visualization task (3D only) — contains tools commonly used for visualization.
- Animation task (3D only) — contains tools commonly used for animation.

### 3.1-4c     Pop-up menu for the selected task

Right-clicking a task presents a list of settings for the task.
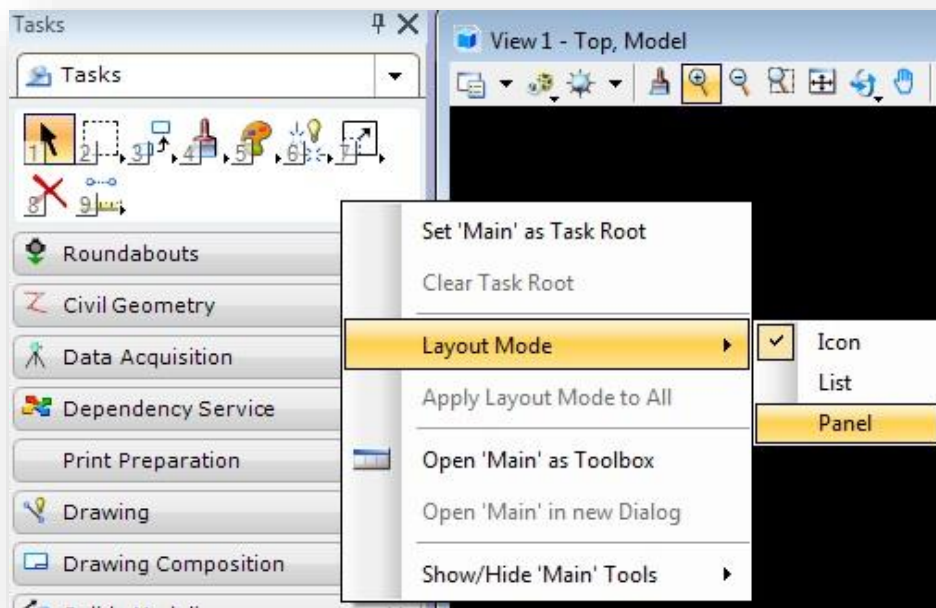


**Task Layout Options**

- Set as Task Root — The selected task becomes the root task, which moves it to the top of the Tasks dialog and hides the other tasks.
- Clear Task Root — Resets the task so that is no longer the root task.
- Layout Mode > Icon — Displays the tools as icons only.
- Layout Mode > List — Displays the tools' icons, position mappings, and names.
- Layout Mode > Panel — Displays the tools' position mappings and icons.
- Apply Layout Mode to All — Applies the current task's layout mode to all tasks.
- Open as Toolbox — Opens the selected task as a toolbox.
- Open in new Dialog — It must be a workflow and must have child tasks in it in order to open it in a separate dialog. When the Tasks dialog is docked, the new dialog appears on a separate tab at the bottom of the Tasks dialog.
- Display Help — Available only if a help topic is linked to the selected custom tool, task, or workflow. Opens the help topic.
- Show/Hide Tools > (Tools' names) — Allows you to show or hide individual tools.
- Show/Hide Tools > Show All — Shows all of the tools.
- Show/Hide Tools > List — Lists the tools in a dialog in which you can choose which to show or hide them.

### 3.1-5   Workflows

A workflow can consist of one or more tasks. In most cases a workflow consists of a collection of tasks organized in the order that you will use them to complete a project or job. Each task contains

the tools you need to complete the task. The Drawing Composition workflow is delivered with MicroStation.



**Workflow icon**
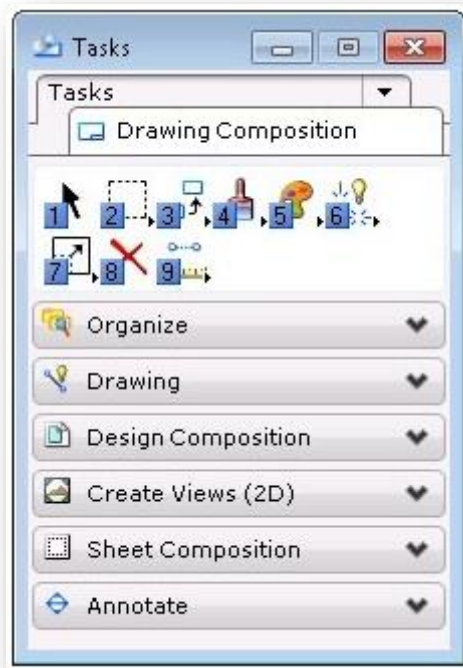


**The Drawing Composition Workflow**

### 3.1-6 INDOT Dialogs, Tasks and Workflows

A new .dgnlib will accompany this document that has many new and exciting changes and enhancements that leverage the latest version of MicroStation.  We (CAD Support) have taken a few steps to organize the task navigation section of the Application Window to make it more user friendly and INDOT specific.  Via the managed workspace in ProjectWise, when a .dgn file is opened the Task Navigation will appear as follows: (See INDOT Tools)
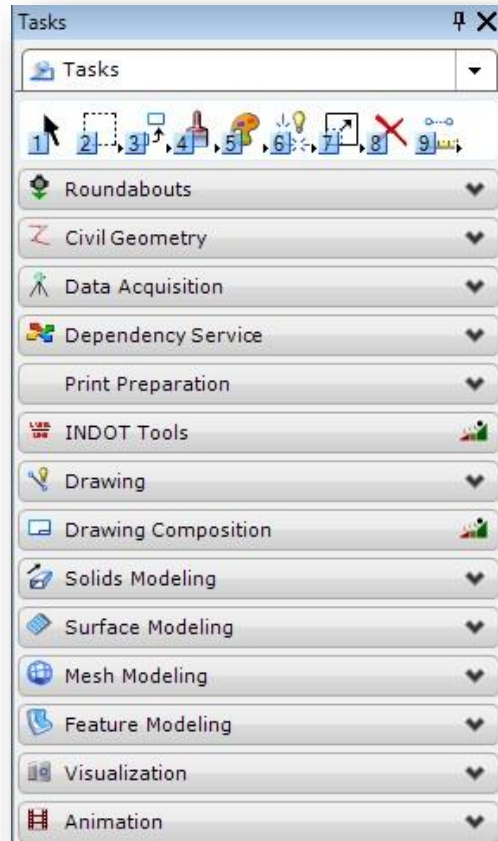
**Task Navigation with INDOT Tools**

### *3.1-6a      INDOT Tools Workflow*

This new INDOT Tools workflow has separated the INDOT specific applications, tools, tasks and dialogs.  Once activated (by selecting) it will appear as in the following image:
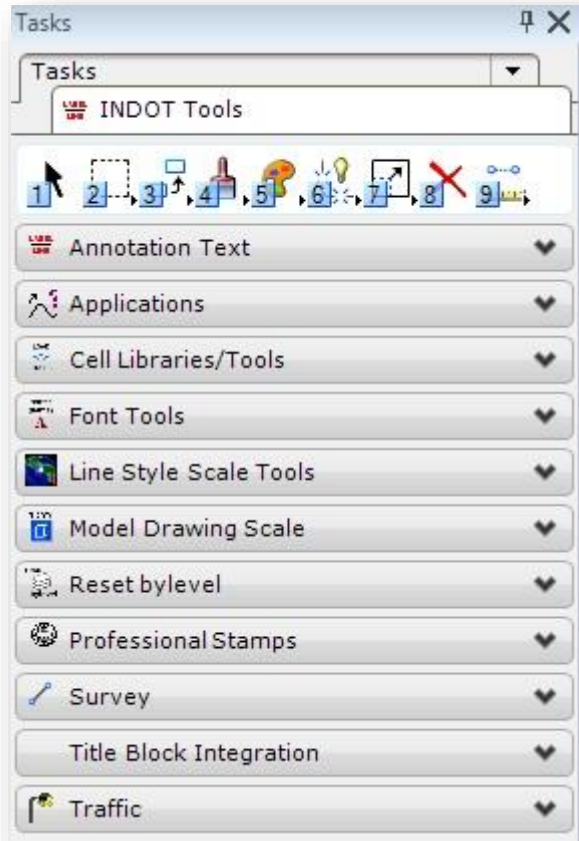
**The INDOT Tools Workflow**

1. Right mouse click in the INDOT Tools tab and select Open 'INDOT Tools' in a new Dialog and you will be provided a separate dialog containing these tools.



**Opening INDOT Tools Separately**

This will allow you to dock it as a separate dialog below the existing Main Tasks dialog.
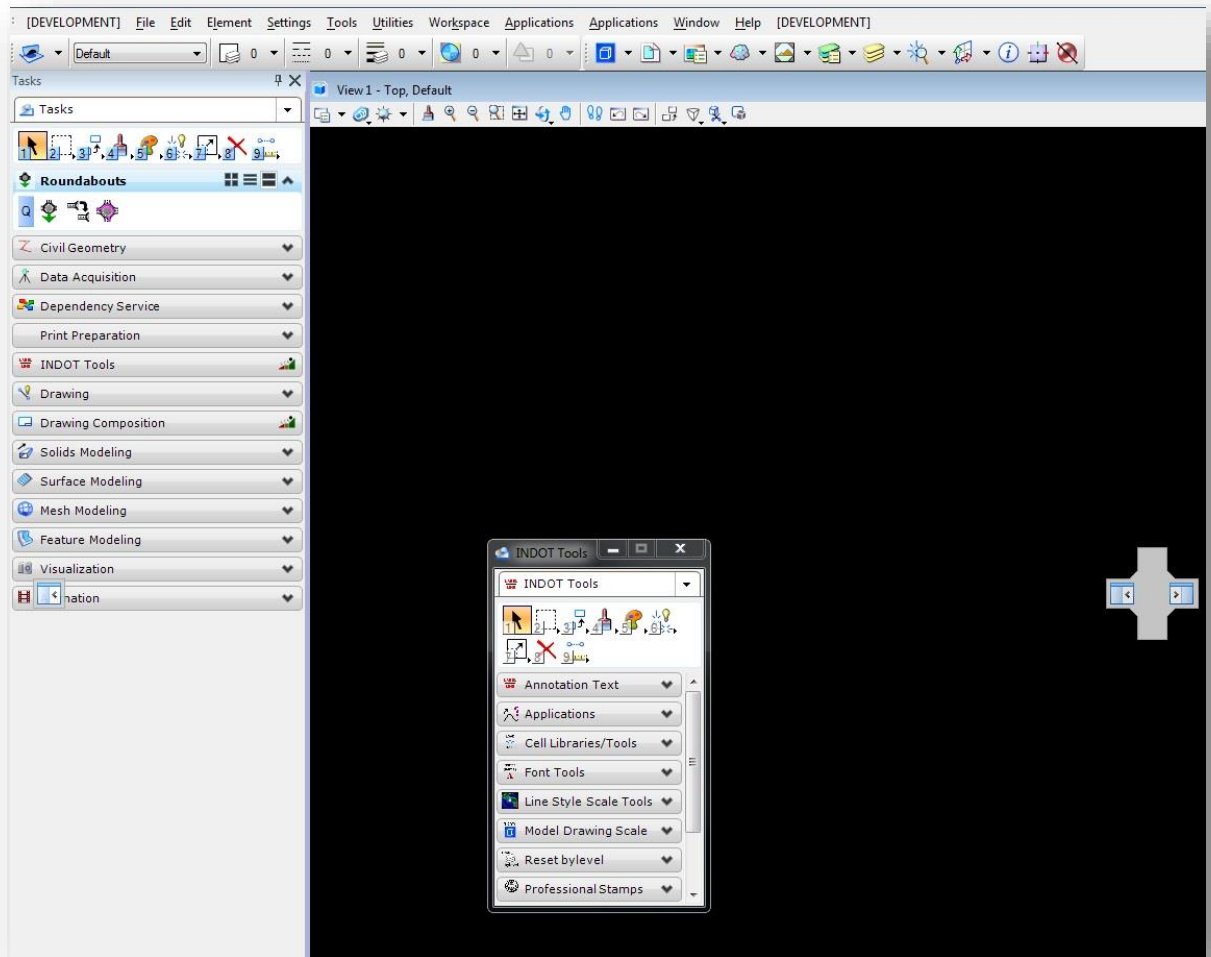
**Docking the INDOT Tools Workflow**

2. Using the docking indicators, select the bottom arrow to place the new INDOT Tools dialog below the other Tasks dialog.
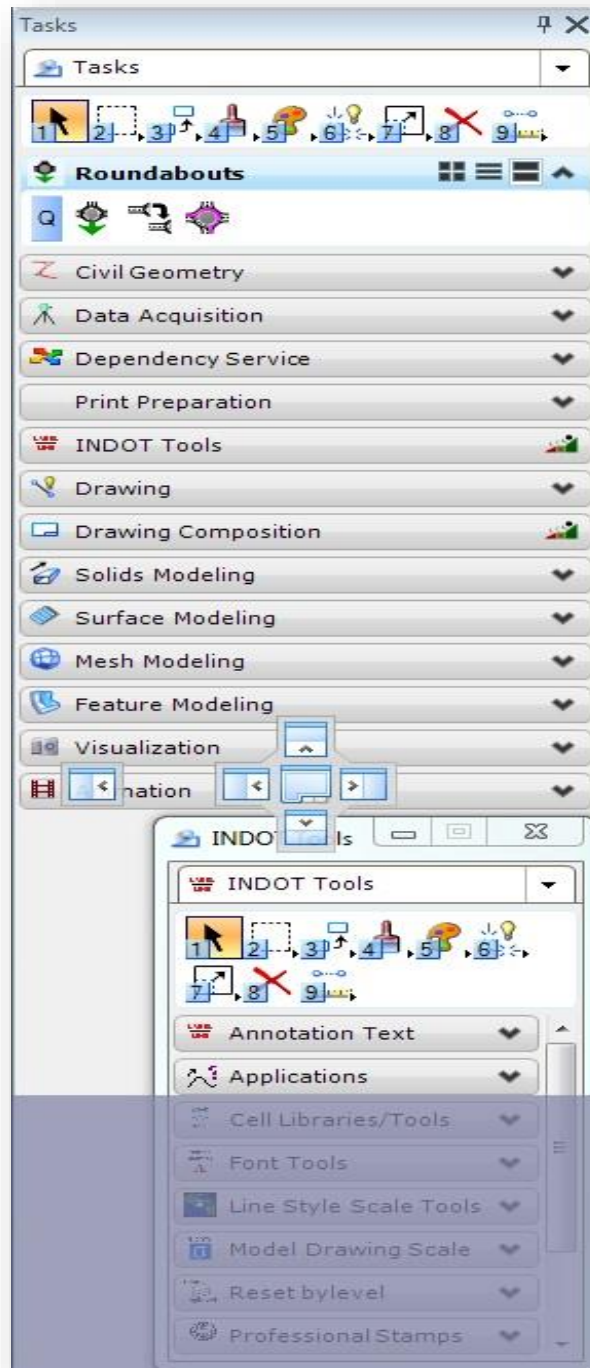
**Split Task/Workflow Docking**

3. Clicking this task displays all tasks in a hierarchical tree. Clicking a task in the tree expands the task, making it the root task, and hides the other tasks.

4. Once a subordinate task has replaced Tasks as the root task, clicking the task's tab displays all tasks in a hierarchical tree. Clicking Tasks in the tree resets Tasks as the root task.

5. It will then appear as shown, giving you access to both dialogs, but keeping them specific and separate.



**Docked/Combined Workflows**

The other option is to use The Auto Hide (pushpin – icon) pointing down, hiding each of the task dialogs off to the left of the screen. The pushpin will then point left.



**Docked**
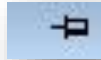


**Hidden**
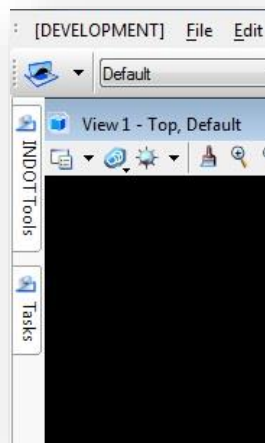


**Un-Pinned Tasks**

When you hover over the tools you wish to use/see they will appear as shown in the following picture:

Task Flyout

If you wish to place/dock the tasks dialog back out in the application window again, click on the pushpin as it points left and make it point down by selecting it.

### 3.1-6b    Tools Included in the INDOT Tools Task Navigation

To ease many steps in the Drafting and Design processes that are discussed in this document, numerous tools have been created to the INDOT Tools workflow.  This section will discuss the various tools included.



Annotation Text

The tools contained in this tool box are used for sheet annotation templates and a variety of other text tools.  Some of the tools are provided to quickly change text case, alignment, and other text functionality, while the majority quickly selects various annotation settings.

**Applications**

The Applications tool box contains quick links that can be used to quickly start and stop the MicroStation plug-in applications that are currently available. These are AutoTrack, Descartes and InRoads.



**Cell Libraries/Tools**

The Cell Libraries/Tools tool box contains quick links to loading each of the INDOT cell libraries. It also contains cell based tools such as the MDL based cell tools application.

Font Tools

The Font Tools option provides a means to quickly change how MicroStation sorts font in the various text placement dialogs.



Line Style Scale Tools

The Line Style Scale tools provide a series of scaling options to override any annotation scale or global scale linestyle scaling options. These should only be used on legacy drawings.
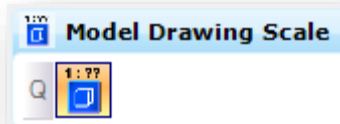


Model Drawing Scale

The Model Drawing Scale tool provides quick access to the drawing scale toolbar where working units and annotation scale can be adjusted.
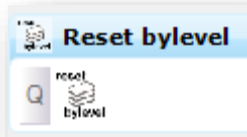


Reset Bylevel

The Reset Bylevel resets all active element symbologies to their current Bylevel state.
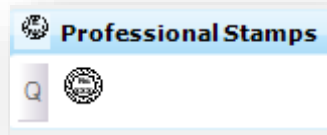
**Professional Stamps**

The Professional Stamps tool loads the PE/LS Stamp cell library.
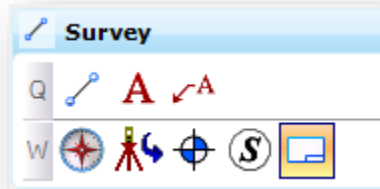


**Survey**

The Survey tool box contains quick links to some of the most commonly used tools with their default settings.  It also provides access to the Survey cells via the Cell Selector.
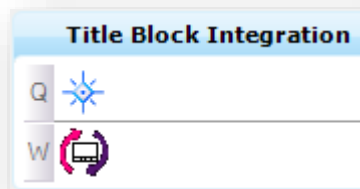


**Title Block Integration**

The Title Block Integration tools provide access to the cell library containing the cells used for ProjectWise titleblock integration, along with a tool used to force a synchronization of title block attributes from ProjectWise.

**Traffic**

The Traffic tool box contains links to all the traffic cell libraries, along with a shortcut to the AutoTrack software.

### 3.1-6c    INDOT – INFO

Various help resources can be found under the Help menu within MicroStation.  For items developed within INDOT or to reach the helpdesk, the INDOT-INFO menu has been created under MicroStation's Help menu.
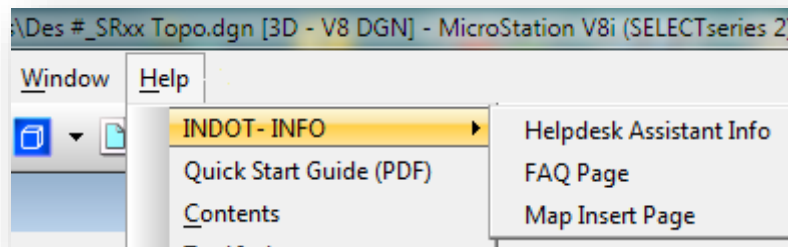


**The INDOT-INFO Menu**

There are 3 options available under this menu.

1.  Helpdesk Assistant Info – This link will take you to the INDOT intranet page for accessing helpdesk support including the IOT helpdesk and application support.
2.  FAQ Page – This link will take you to the INDOT-CAD FAQ page with quick resource documents for the CAD environment.
3.  Map Insert Page – This link will take you to the GIS Map Insert page for MicroStation. Additional information on this tool can be found in section 10.3 Map Insert Application.

## 3.2    User Interface Enhancements

The addition of drag and drop support, the ability to customize right-click menus and the Tasks dialog, and three new ways to customize the status bar make the interface easier to use.

### 3.2-1   Drag and drop support

As of MicroStation V8i (SelectSeries 1), additional drag and drop functionality has been added.

*Note:*  *Not all functionality will be available when working within ProjectWise.*
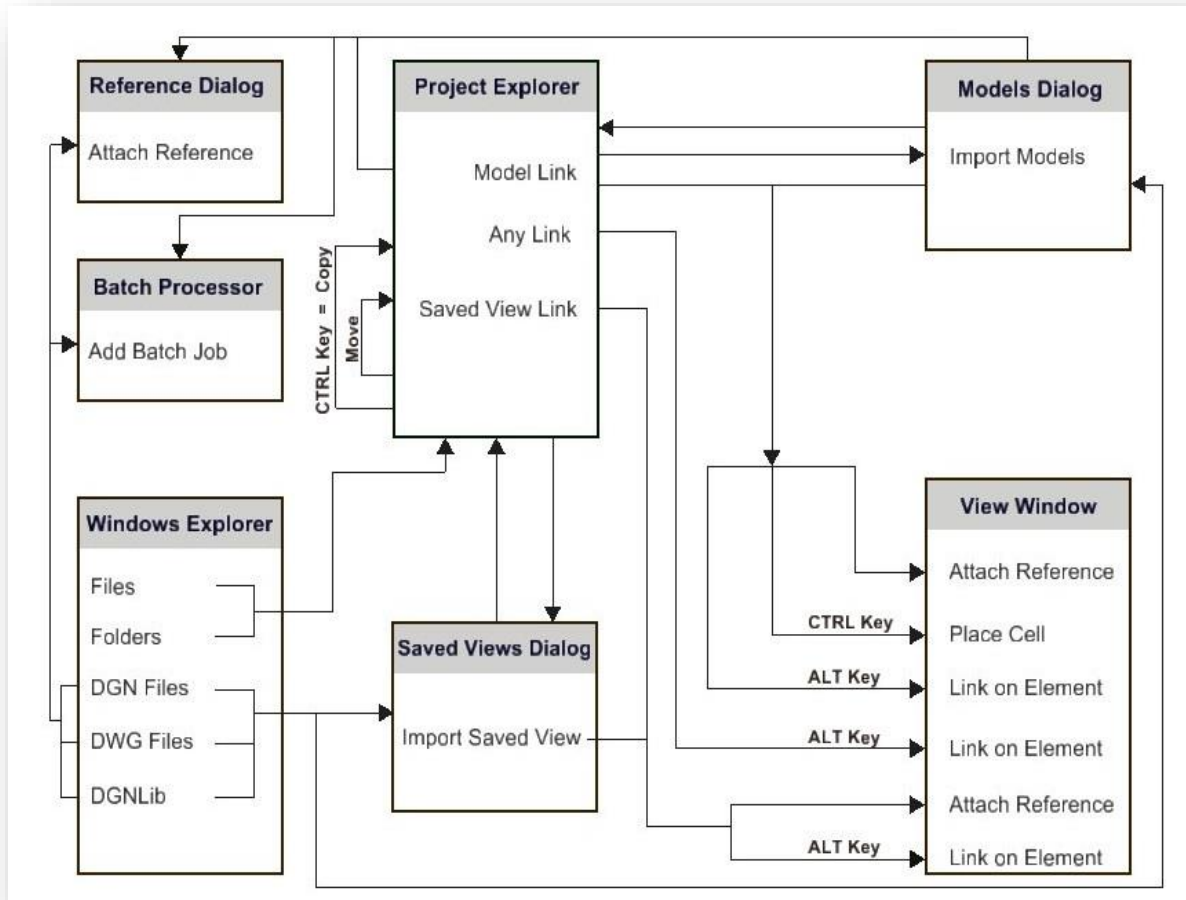


**MicroStation Native Drag and Drop Operations**

Some of the possible drag and drop operations are:

- Drag and drop models from the Models dialog to the Project Explorer dialog
- Drag and drop a saved view from the Saved Views dialog to the Project Explorer dialog
- Drag and drop files and folders from Windows Explorer to the Project Explorer dialog
- Drag and drop links from the Project Explorer dialog to a view window
- Drag and drop links within the Project Explorer dialog
- Drag and drop saved views from the Saved Views dialog to a view window

- Drag and drop models from the Models dialog to a view window
- Drag and drop DGN, DWG, and DGNLIB files from Windows Explorer to the Saved Views dialog

One common use of the drag and drop feature is between the Models dialog and a view window.
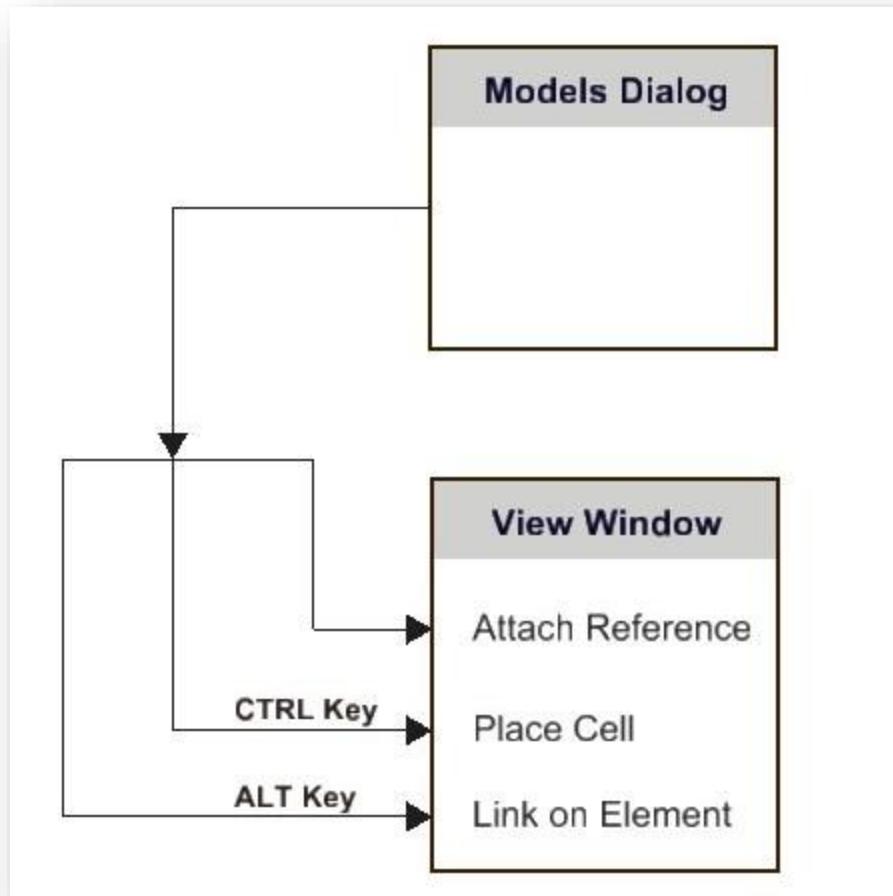


**Drag and Drop Functions with Command Modifiers**

### 3.2-2  Right click context menus based on named expressions

When customizing right-click context menus and menu items (*Workspace > Customize > Context Menus* tab), you can show or hide and enable or disable them based on tests created in the Named Expressions dialog. For example, you can create a right-click menu item that will be visible only when you are working on a sheet model by setting the menu item's Show/Hide Test property to "IsSheetModel." Or you can create a right-click menu item that will be visible but enabled only when you are working on a sheet model by setting the menu item's Enable/Disable Test property to "IsSheetModel." You can determine where the context menu or context menu item will be placed in the right-click menu by setting its Priority field.

### 3.2-3   Show / hide support in Tasks dialog

Right-clicking a task in the Tasks dialog opens a menu that allows you to show or hide the following:

- Show/Hide Tools > (Tools' names) — Allows you to show or hide individual tools.
- Show/Hide Tools > Show All — Shows all of the tools.
- Show/Hide Tools > List — Lists the tools in a dialog in which you can choose which to show or hide them.

### 3.2-4   Show/hide support in status bar

Right-clicking in the status bar opens a menu allowing you to show or hide sections of the status bar.
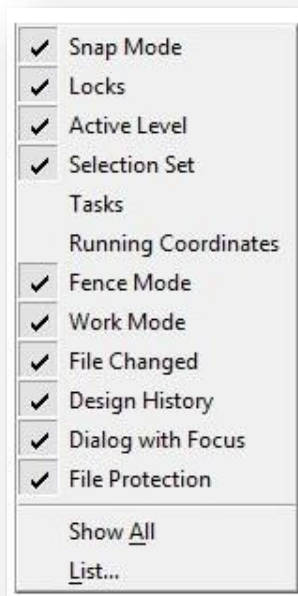


**Status Bar Options**

### 3.2-5   Coordinates display in status bar

Right-clicking in the Running Coordinates section of the status bar turns on the coordinates display. As you move your cursor, the coordinates of your current position display according to the active Tentative Point Mode. When you left-click, a menu displays six options. The Delta modes show the X, Y, and Z displacement from the last data point. The Distance modes show the distance and direction from the last data point.
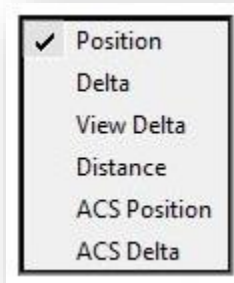
**Coordinate Formats**

### 3.2-6   Locks dialog

Left-clicking the Locks icon on the status bar and selecting Full on the popup menu opens the Locks dialog.
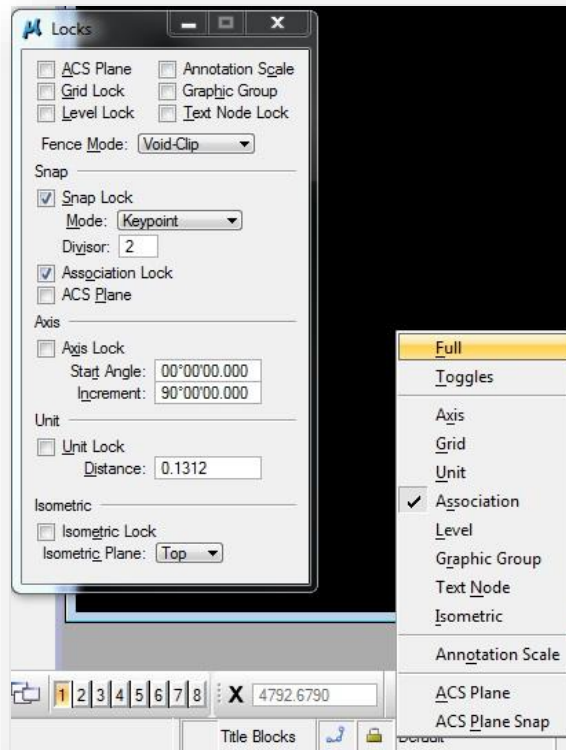


**Locks Dialog and Menu**

## 3.3 Models Enhancements

The enhancements to Models include additional viewing capabilities, Project Explorer integration with the Models dialog, and sheet name display in the Models dialog.

*Models have additional new features in MicroStation V8i (SS1and SS2).*

### 3.3-1 View different models from the same file in each view

You can view more than one model from the same file in separate views. In the example below, notice that the "Multi-models View" view was created and the titles of the two views match two separate models in the Models dialog.
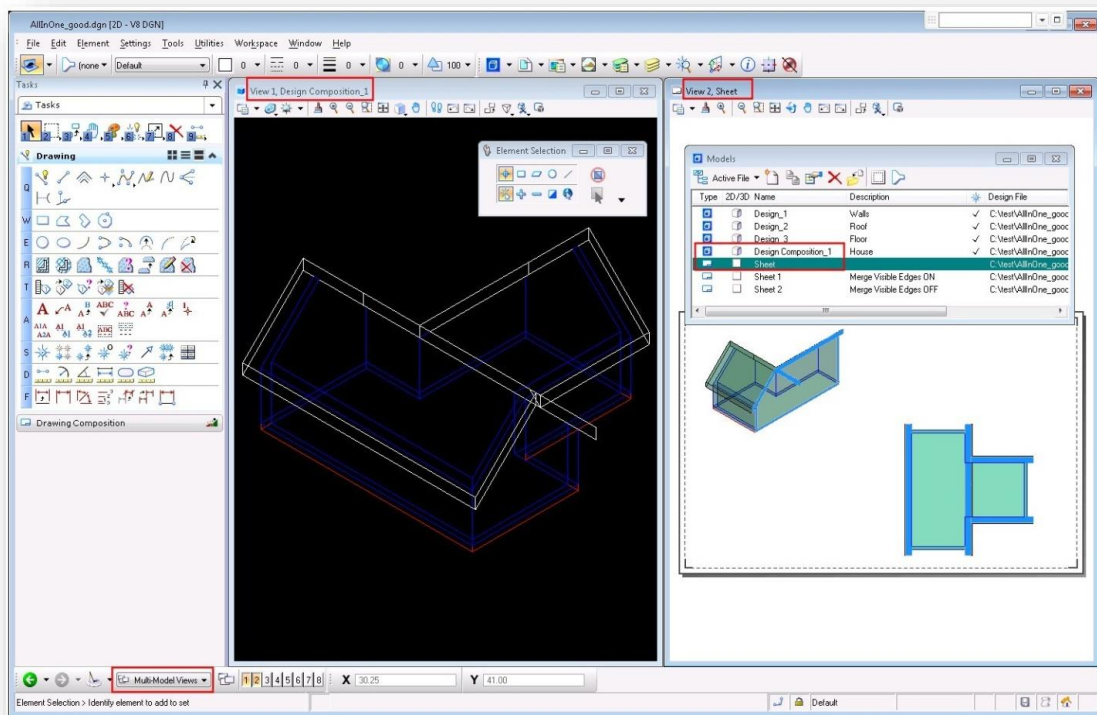


Multiple Model Display

### 3.3-2 Project Explorer integration in Models dialog

An icon has been added to the Model Manager dialog. The icon puts the dialog into one of two modes:

*Active File Mode:*  Shows the current source of the models. If set to Active File, the models are in the master file. If set to Link Set, the models are in Project Explorer.
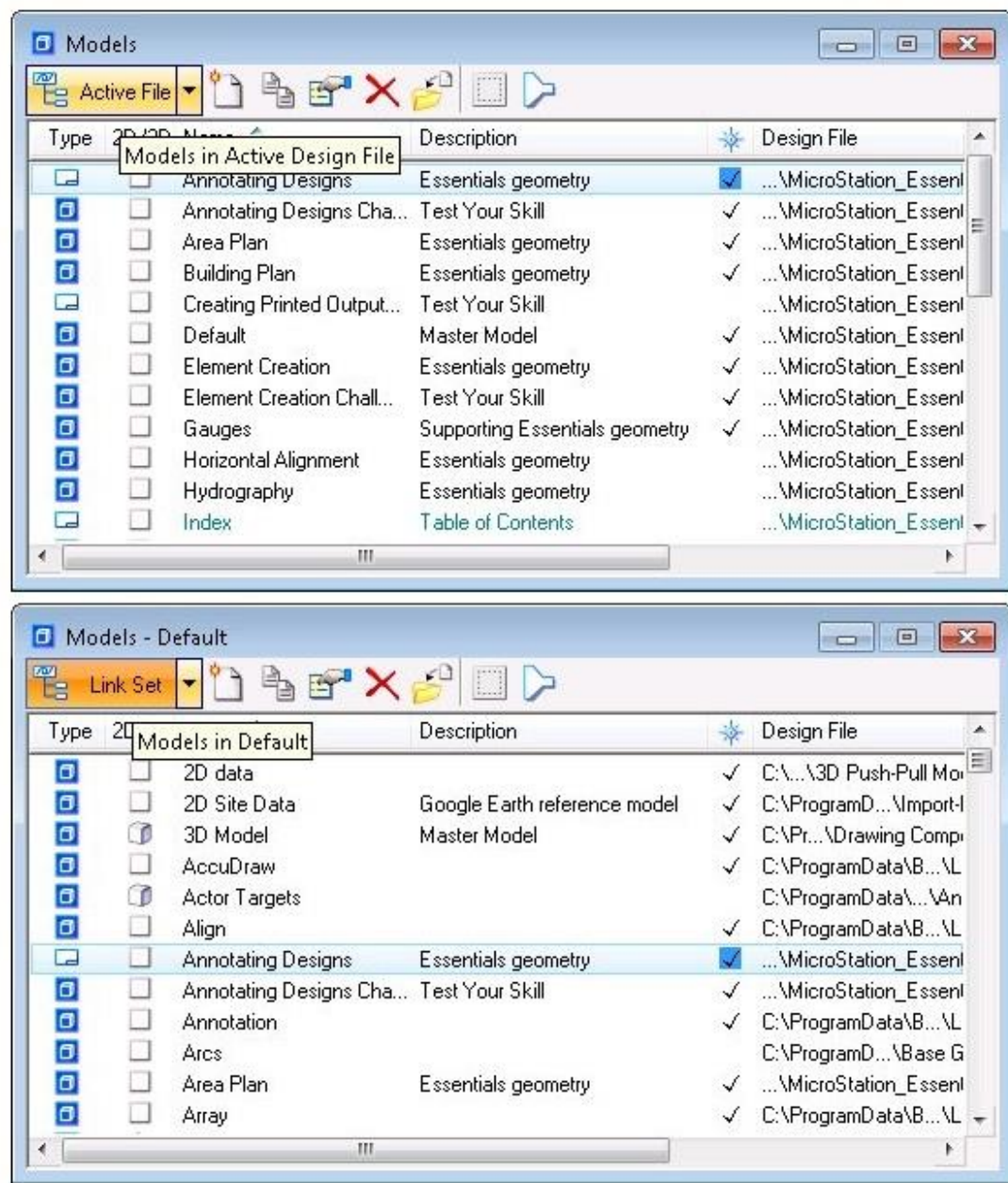
**Active Files/Link Set Models**

*Link Set Mode:* Shows a Project Explorer layout, allowing you to select an active file or folder from the active project in Project Explorer.
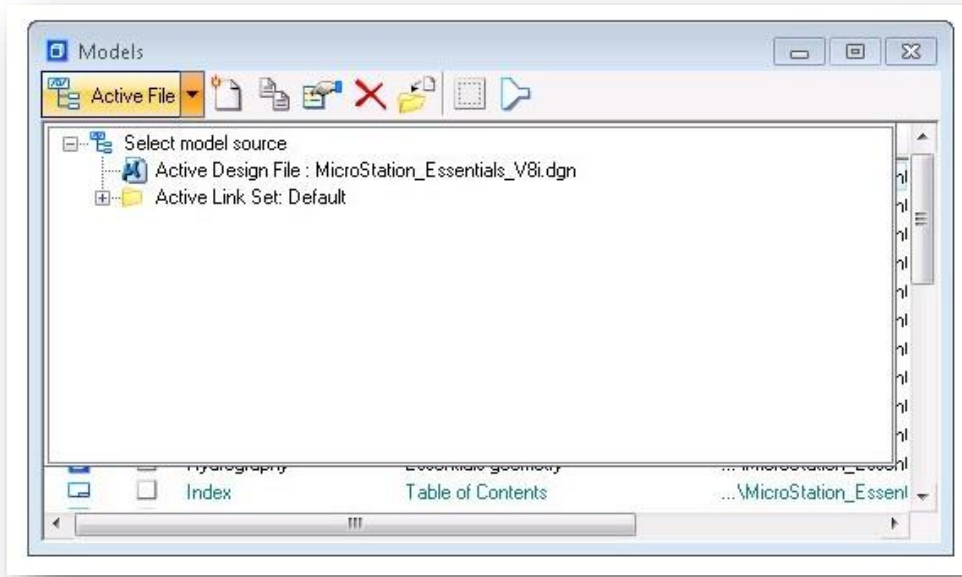
**Active File Model Options**

### 3.3-3 Models dialog displays the sheet name

The Sheet Name column has been added to the Models dialog in support of sheet sequencing. The sheet name should match the corresponding sheet link name in Project Explorer. If the two get out of sequence (that is, the sheet link name was changed in Project Explorer or in the Model Properties in the Model dialog), the new sheet name can either be pushed out from Project Explorer to the model or pulled from the model back to Project Explorer so they are synchronized.
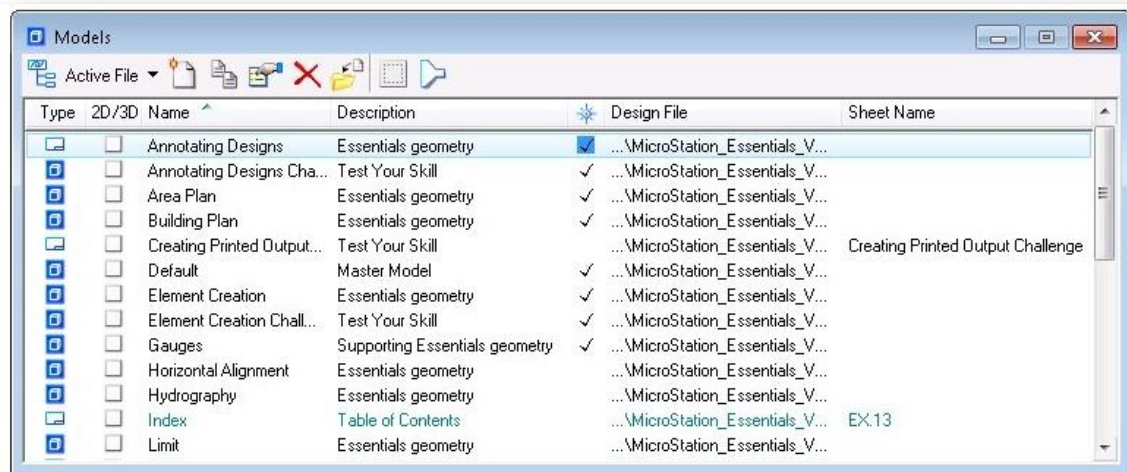


**Models with Sheet Names**

## 3.4    Menu Changes

The following sections list changes in the menu structure. The Edit, Workspace, Window, and Help menus are unchanged.

### 3.4-1    File menu changes

- Selecting Import > CAD Files opens the Import dialog.
- Selecting Export > SVG opens the Export SVG dialog.
- Selecting Export > Maxwell Scene opens the Maxwell Export Settings dialog.
- As of MicroStation V8*i* SelectSeries 1, exporting to Maxwell Scene has been replaced by exporting to Luxology Scene.
- Selecting Export > OBJ opens the OBJ Export Settings dialog.
- Batch Print is removed and has been replaced by Print Organizer. Selecting Print Organizer opens the Print Organizer dialog.
- Selecting File > Publish i-model opens the Publish i-model dialog.
- Selecting Export > Luxology opens the Create Luxology File dialog, which is used to export the .ixo file.
- Selecting File > Point Clouds opens the Point Clouds dialog.

### 3.4-2    Element menu changes

- Detailing Symbol Settings is removed. It is replaced by Detailing Symbol Styles, which opens the Detailing Symbol Styles dialog. In this dialog you can create and edit detailing symbols.
- Selecting Element Templates opens the Element Templates dialog, which in the previous edition was accessible in the Customize dialog.

### 3.4-3    Settings menu changes

- Selecting Display Styles opens the Display Styles dialog.
- Locks > Depth Lock is removed. It is no longer used.
- The Rendering submenus have been reorganized. Selecting Rendering > Settings opens the Render Settings dialog.
- Selecting Rendering > Maxwell Materials opens the Maxwell Material Settings dialog.
- As of MicroStation V8*i* SelectSeries 1, Maxwell Materials rendering has been replaced by Luxology Rendering.
- Snaps > Tangent From has been renamed Tangent Point.
- Snaps > Perpendicular From has been renamed Perpendicular Point.
- Rendering > Light Setup is removed. The Light Setups and Light Manager dialogs have been consolidated into a new Light Manager dialog, which is opened by selecting Rendering > Light Manager.

### 3.4-4    Tools menu changes

- The Tools menu has been reorganized. All toolboxes are accessible from the Tools menu. Each tool appears in only one toolbox.
- You can select tools and view controls directly from the Tools menu.
- For example to select the *Scale* tool, select Tools > Manipulate > Scale. To open the Manipulate toolbox, select Tools > Manipulate > Open as Toolbox.

- The Main submenu returns to provide more convenient access to child toolboxes of the Main toolbox.
- The Geographic submenu provides access to geographic tools.
- The Clash Detection menu item provides access to the Clash Detections toolbox.
- The Point Clouds menu item provides access to the Point Cloud toolbox.

### 3.4-5   Utilities menu changes

- The Render menu item's submenus have changed. The submenus are View, Fly Through, Solar Study, Animation, and Luxology.
- Selecting Named Expressions opens the Named Expressions dialog.
- The Generate Section menu item is removed.
- The Install Fonts menu item is removed.
- The Render > View menu item is removed.
- The DWG > Audit menu item is removed.
- The DWG > Recover menu item is removed.

### 3.4-6   Help menu changes

- Selecting Help > Quick Start Guide (PDF) opens the MicroStation Quick Start Guide.

### 3.4-7   Application menu

- No significant changes
- Due to inconsistencies with AutoTrack, SignCAD, and InRoads; multiple Application menus may appear.

## 3.5      Text Enhancements

Text enhancements include the ability to change case by a selection set or fence. The Advanced tab allows for comparisons between styles. Word Processor updates include an insert field, subscript and superscript icons and right-click operation to change the case. The Edit Text tool retains its text settings and the Find/Replace Text tool supports data fields.

### 3.5-1   Change case by selection set or fence.

This tool is used to change the case of a piece of text. Case change options include Upper Case, Lower Case, Title Case, and First Capital. This tool also supports text selection via a fence.  This tool can be found under the *Tools > Text* menu, labeled as *Change Case*.  This tool supersedes the previous version included with the TextUtil.ma package.



Change Text Case

### 3.5-2 Text Style dialog enhancements

For information on INDOT Specific fonts, please see Appendix C (pg 460).

#### 3.5-2a  Advanced tab allows comparison between styles

Two new modes (Comparison and Differences) have been added to the Advanced tab of the Text Styles dialog. Comparison mode shows a side by side comparison of the properties of two selected text styles. Differences mode shows the differences of the properties of two selected text styles.
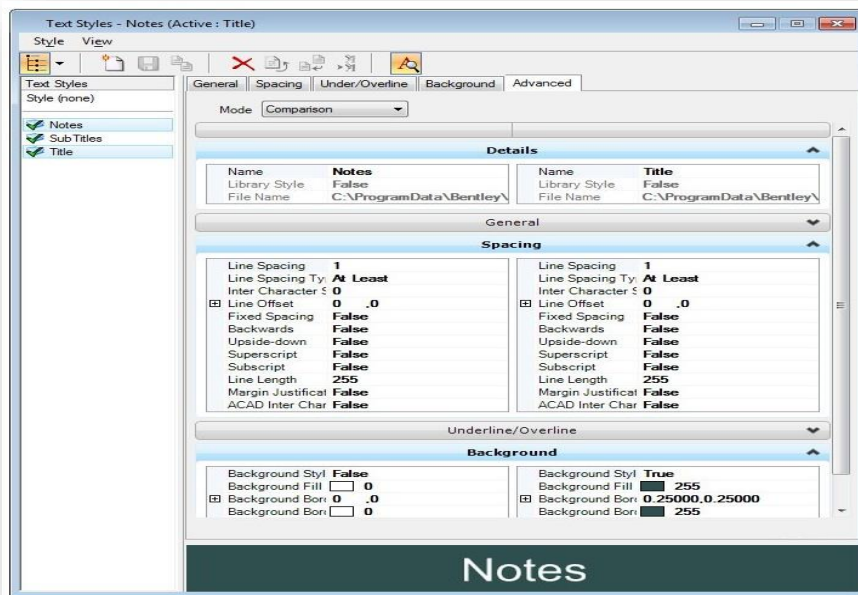


**Text Style Comparison**
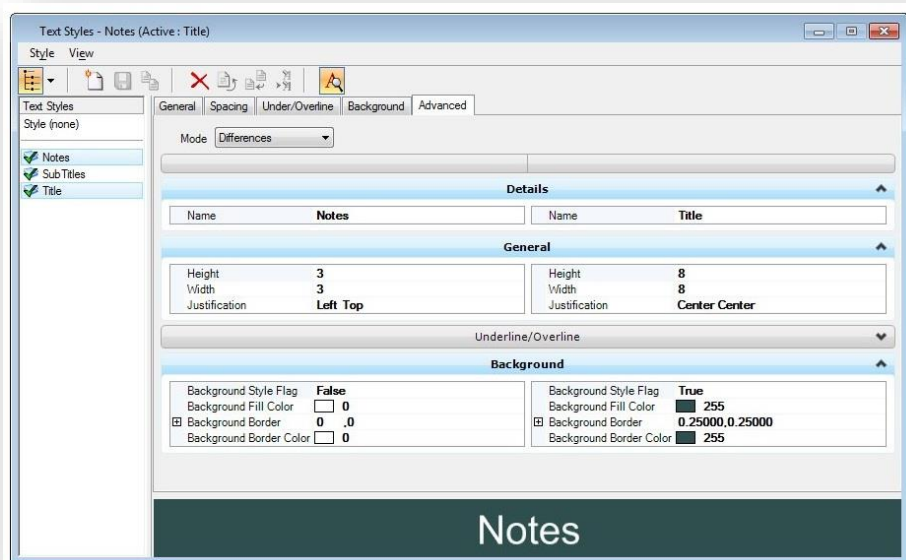
### 3.5-3   Word Processor enhancements

Three new icons have been added to the Text Editor — Word Processor dialog.

The Insert Field icon opens the new Field Type Picker dialog, used to select the type of field to be created. See Placeholder fields for more information.

<div align="center">

*f(x)*

</div>

<div align="center">

**Text Functions**

</div>

The Superscript icon allows you to create text with superscript by typing in the text, clicking the superscript icon, then typing in the number. The Apply Changes to all Text check box must be toggled off to place superscript.

<div align="center">

$\square^{2}$

</div>

<div align="center">

**Superscript Text**

</div>

The Subscript icon allows you to create text with subscript by typing in the text, clicking the subscript icon, then typing in the number. The Apply Changes to all Text check box must be toggled off to place subscript.

<div align="center">

$\square_{2}$

</div>

<div align="center">

**Subscript Text**

</div>

#### 3.5-3a      *Right-click to change case*

The Change Case > Upper Case and Change Case > Lower Case menu items have been added to the right-click menu of the Text Editor — Word Processor dialog.

### 3.5-4   Using Fonts

MicroStation supports three types of fonts: True Type, RSC (MicroStation Resource Font) and SHX (AutoCAD Fonts).

### *3.5-4a    True Type Fonts*

Many TrueType fonts are delivered with Windows, and many more are available from various vendors for free or for purchase. *TrueType is an industry standard format supported by MicroStation*. In general, this is the recommended font type for use in MicroStation. TrueType fonts also include full Unicode support (note: not all TrueType fonts contain characters for all languages). TrueType fonts are always filled, and therefore do not provide good support for "stick" fonts (as opposed to SHX and RSC fonts).

### *3.5-4b    RSC (MicroStation Resource Font)*

This font format is MicroStation-specific, and RSC fonts are stored in MicroStation resource (.rsc) files. A single resource file may contain several RSC fonts. RSC fonts have a number and a name, but only one font by a given number can be used at a time during a MicroStation session. If multiple RSC fonts share the same number, the last one to be loaded is the font assigned to that number in a given session. RSC fonts are locale-encoded, but support more than 255 characters (e.g. for some Asian languages). The code page of RSC fonts is specified in the font configuration file. If you use font characters for symbols, use RSC fonts rather than TrueType fonts.

*Due to various compatibility issues, and lack of customization tools, RSC other than those provided with SignCAD are no longer available for use in the INDOT Workspace.*

### *3.5-4c    SHX (AutoCAD Fonts)*

MicroStation supports AutoCAD's font format (including normal SHX fonts, SHX Unifonts, and SHX Bigfonts). You should use SHX fonts only when you must ensure AutoCAD compatibility, and TrueType fonts are not a viable option. SHX Unifonts are the current standard, and allow a single font (and font file) to contain characters in the entire Unicode range. Older SHX fonts only support up to 255 characters, and thus require a paired SHX Bigfont to support languages with more than 255 characters (e.g. Asian languages). In MicroStation, specifying a paired SHX Bigfont is optional, and is recommended if you require characters that cannot be provided by the base SHX font.

If AutoCAD is installed, MicroStation searches for SHX fonts in AutoCAD's Fonts directory (the "Fonts" folder in the installation directory of the most recently used version of AutoCAD). With or without AutoCAD, MicroStation searches the directories specified by MS_FONTPATH, as well as the same directory as the design file requesting the font.

DWG Export: AutoCAD natively supports SHX fonts, and no special export is performed.

### 3.5-5    Edit Text tool retains text settings

In the past, the Edit Text tool would change the active settings whenever you edited a piece of text. This behavior has been changed so settings revert to the previous settings when the Edit Text tool is closed. This change affects the active settings only and not the text styles.

### 3.5-6    Find/Replace Text supports data fields

The Find/Replace Text tool can now find and replace text in enter data fields.

### 3.5-7 Disabling Text Field Backgrounds

Various text tools may take advantage of MicroStation fields, tying Model or other properties to a piece of text. Depending on the workflow, it may be desirable to disable the background of the text field for use in other applications.

To disable the field background, go to the *Workspace -> Preferences* menu and navigate to the Text option on the left. Enable the fourth option, Hide Field Background.
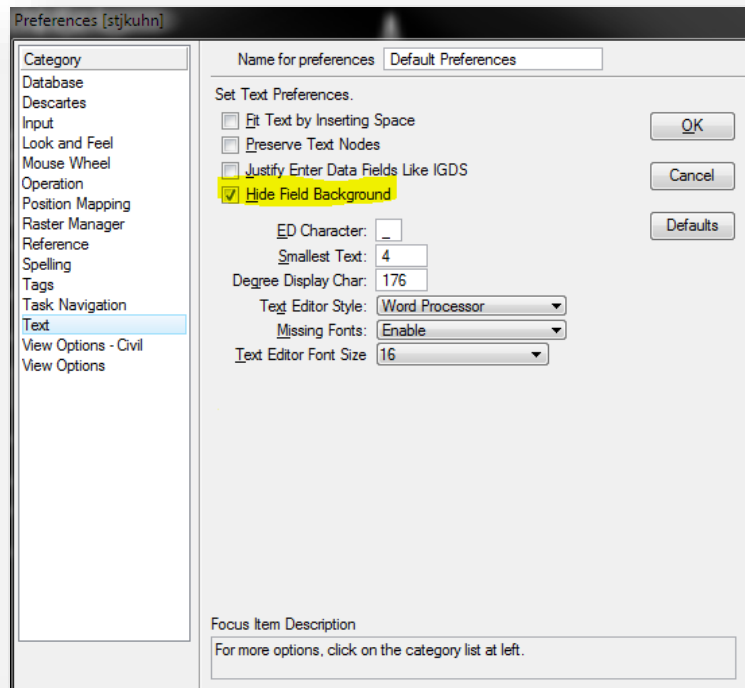


**Disabling Field Backgrounds**

## 3.6    References Enhancements

A major enhancement to references is the ability to edit a reference from within the active model.

In addition, the active model's annotation scale applies to annotations in references.

*References have additional new features in MicroStation V8i (SelectSeries 1).*

### 3.6-1 Activate reference for in-place editing

A new capability lets you edit a reference in-place. That is, you can edit a reference from within the active model. To do this you first must activate the reference.
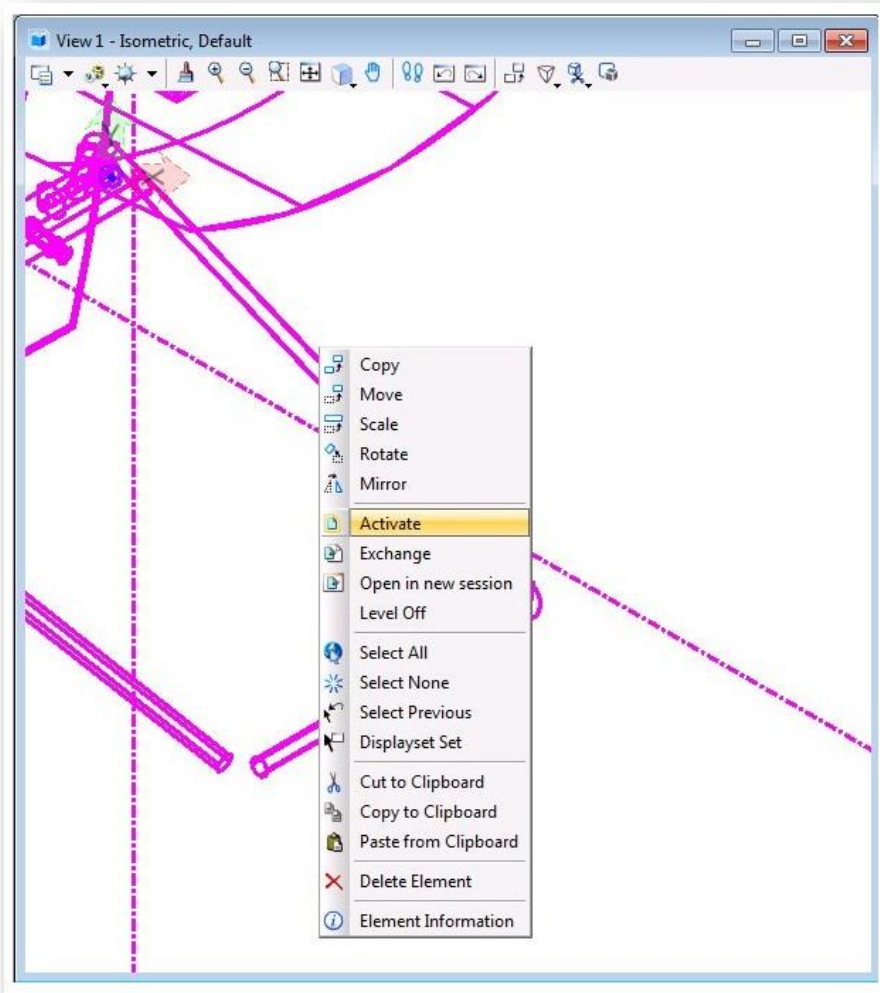
**Reference Activation**

When a reference is activated:

- Only operations on the activated reference are permitted.
- By default, all elements in references above the activated reference in the file hierarchy, as well as the active model, are displayed with an override color. You can control whether or not an override color is used, and what the color is.
- If you activate another reference, the currently activated reference is automatically deactivated.
- The reference is locked so that it cannot be edited in another session.
- DGN library data, such as levels and level filters, is not available in an activated reference file.

### 3.6-2  References support active model annotation scale

In the past you may have added annotations to design models that are referenced into sheets. You also may have added annotations directly on the sheet. If the annotations were too small, you would have changed the model's annotation scale, but that would have affected only the annotations directly on the sheet. The annotations in the reference were not changed. Therefore, the only way you could change the annotations was to exchange into the reference and scale them.

Now the active model's annotation scale applies to annotations in references, too. If you change the scale of the annotations on the sheet, the scale of the annotations in the references changes as well.

To make a reference's annotations use the active model's annotation scale, you must turn on this option. In the References dialog there is a new column named Use Active Annotation Scale. If this column is not visible, right-click in the column headings and turn it on. To turn on this option for a reference, click in this column to make a check mark appear.

### 3.6-3  Detail scale

Detail scale helps you represent the Master:Ref scale in terms of the sheet scale. For example, if your sheet scale (annotation scale) is 1/8" = 1´ and you want to place a detail reference of scale 1/4" = 1´, simply pick the new scale from the Detail Scale combo box. It automatically computes the Master:Ref scale as 2:1.

### 3.6-4  Synchronize with saved view

When you attach a saved view, you can specify that the display of the reference should always be synchronized with the original saved view. In the Reference Attachment Settings dialog, turn on the Synchronize with Saved View check box.

In order to change the appearance of a reference, you have to modify the saved view that it is synchronized with. This is to ensure fidelity of display properties such as view attributes, level masks, clip volume, display styles and others.

When synchronized, the reference location is also realigned. Specifically, when the reference is synchronized with the saved view, the reference center and saved view center remain aligned. You can see the effect of this in two ways:

In an unsynchronized state, the reference is first shifted and then synchronized.

When synchronized, the saved view center is changed; for example, the saved view is stretched.

### 3.6-5  Drawing title

When attaching a reference on a sheet, you can optionally create a drawing title. A drawing title describes a drawing on a sheet. If there are four references on a sheet (top, front, right, and isometric), you create four drawing titles to demarcate the four references. It plays a crucial role in automatically linking call-outs across sheets. Properties such as Name, Detail Scale, and Identifier are displayed in the call-outs in the form of fields.

### 3.6-6   Change Attachment Orientation

In this edition you can change the orientation of the reference attachment by clicking the reference's Orientation column in the References dialog.

### 3.6-7   Reference Detail Scale

When attaching a reference (a design or drawing model) into a sheet model, the referenced model's annotation scale is applied as the detail scale, and the Reference Scale (Master:Ref Scale) is calculated from the referenced model's annotation scale and the active model's annotation scale.

### 3.6-8   Working with RDL Files

With this release of the CAD Workspace, ProjectWise and redlining capabilities are available via a web browser at dotwise.indot.in.gov.  Please note that this site is not available internally.  The .rdl file is a redlining file created by using these tools and can be attached as a standard reference in MicroStation and used in the same manner.

# 4.  Plotting

Plotting has not changed much since version 2.0.  This document will include some procedures/enhancements that may have previously been taught and passed out.  We feel that it is important to keep these up to date and relevant.  The most significant enhancement to plotting is the streamlining of the procedure used to take advantage of Electronic Signatures in Adobe Acrobat. Other enhancements include the use of a standardized print queues to better control the quality of the printed product as well as the use of .pdf as the finished plotted product.

All of the enhancements to the plotting environment are a product of countless hours of research based on the lessons CAD Support has learned over previous releases of the workspace and best practices in place within INDOT and other agencies.

## 4.1-1   PDF Support Only

Due to the number of different plotter and printer configurations currently available across all INDOT locations, CAD Support is now using a single driver/multiple plotter setup for exporting files to PDF. As PDF is largely becoming the standard format for the publishing of documents to ERMS and for transport across the agency, CAD support has found that this method will allow better control for the consistency of plots, while maintaining the flexibility to send the completed PDF to any preferred hardcopy device (printer/plotter).

## 4.1-2   Attaching Plot Drivers

All files plotted from IPLOT or ProjectWise InterPlot Organizer will be plotted using one of 3 PDF plot queues.  Those 3 plot queues can be attached from the following location

DOTCADP03PW

You will need to type the following into the address bar... \\DOTCADP03PW\

At this location, there will be 3 separate plot queues for your use.

- HPQueue1
- HPQueue2
- HPQueue3
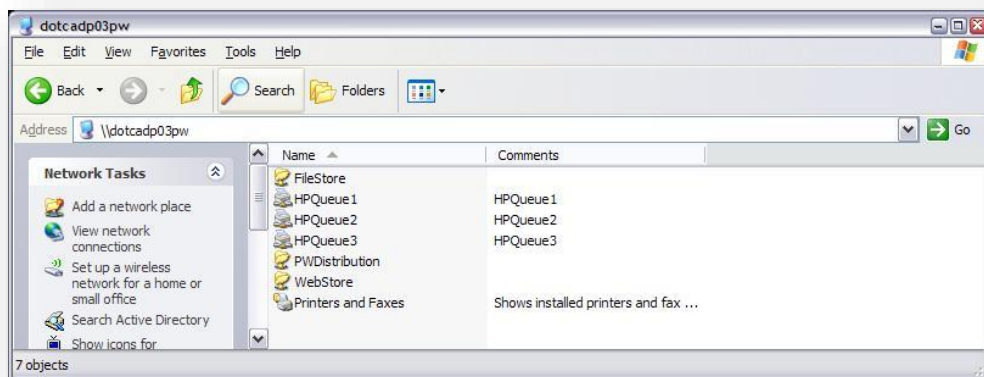
Each of which can be selected by simply double clicking on the queue in your windows explorer. You may use any of these plotters, as all are configured the same. Multiple queues are provided so as to better accommodate any load issues.

### 4.1-3    HP Plot Queue Settings

It has been found that using HP based drivers for the 5500ps plotters has provided a more efficient and reliable plot creation engine than the OCE. As such, there will be some changes to the plot creation workflow to take into account the small differences in form sizes and procedures required to get comparable output to the OCE plot queues.

The most important difference between the two units, are the form sizes. Please see the following table to find a size comparison that will equate the most common OCE based form sizes to the new HP queue.

| OCE Form | HP Form |
|---|---|
| Oce D+ 24x36 in | Oversize: Arch D |
| Oce B+ 12x18 in | Oversize: Arch B |
| Oce B 11x17 in | Oversize: ANSI B (Tabloid) |

.set files will be provided to appropriately setup these form sizes for a wide variety of prints. Should a manual adjustment be necessary, the following adjustments will need to be made:

Under the File -> Print Setup menu option, make sure your printer is defined as one of the HPQueues.
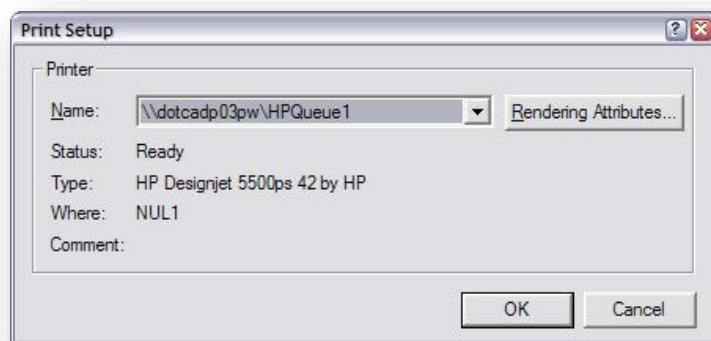


Print Setup

This will make the HP form sizes available for selection on the plot properties dialog. When viewing the properties of a plot, all of your prior settings will be the same including .set files (unless re-applying the new ones), plot area, pen tables, etc. The changes that will need made are on the Layout tab.
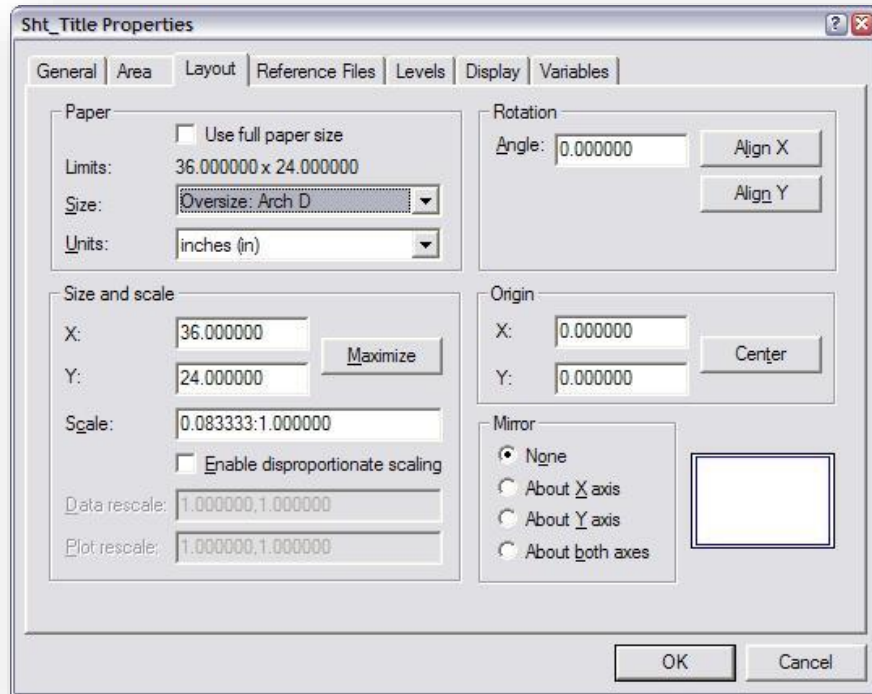
**Iplot Properties**

The changes for using the HP forms are as follows:

1. Make sure you've selected the appropriate form size from the comparison chart earlier in this section.
2. Do *NOT* check "Use full paper size". HP Forms have a built in margin factor that will cause the scaling of your prints to be incorrect. By disabling the full paper size setting, it will recognize only the printable area which is consistent with the old OCE forms.
3. All other settings should remain the same. There may be specific adjustments that need to be made on a per-sheet basis.

## 4.2    Design Scripts and Settings Files

### 4.2-1   Overview:

Because of the greater functionality of design scripts, INDOT will no longer use pen tables to define properties of plot sets. Design scripts allow for all of the functionality of pen tables in addition to allowing for more precise pen weights, screening, etc.

Also as a further integration into ProjectWise, all Design Scripts and Plot Settings files have been stored in ProjectWise. This insures that all users have access to the most up to date file(s) at all times.

All ProjectWise InterPlot Organizer settings files are located within ProjectWise at the following location:

- INDOT HPQueue_AN.set - to be used with Electronic Signatures and Auto Page Numbering (for use with the HP Plot Queues for full size sheets).
- INDOT HPQueue_NN.set - to be used with Electronic Signatures and no Page Numbering (for use with HP Plot Queues for full size sheets).
- INDOT HP_Letter_AN.set - to be used with Electronic Signatures and Auto Page Numbering (for use with HP Plot Queues, and letter size sheets).
- INDOT HP_Letter _NN.set - to be used with Electronic Signatures and no Page Numbering (for use with HP Plot Queues, and letter size sheets).

The Design scripts can be found in the "*Design Scripts*" folder directly under the Plotting folder. These will be automatically attached when one of the previously listed .set files are used.

In addition to the above .set files, you will also find a comparable version of the .set to be used with sheets cut from InRoads (ex. INDOT InRoads_HPQueue_AN.set). These sheets do not follow the standard convention of being cut to true sheet models with paper border, rather they are adjusted differently. To compensate, an exterior boundary set to transparent has been created for these borders. These .set files use this shape as the plotting extents for InRoads sheets. Other than that difference, these .set files should be used and configured in the exact same manner as previously shown. It's highly recommended that the .set files be attached at the time of plot creation to allow all instances of a level name to be found and taken into account. Not doing this may cause Iplot to find the incorrect instance of a plot shape in a given file and not return the plot expected.

All INDOT design scripts (.pen files) perform the following functions and are automatically attached by the previously listed .set files:

- Sets pen thicknesses
- Applies 60% screening (Gray Scale) on Cross Section Grid Lines
- Substitutes Printer name, File Name and/or date
- Addresses Electronic  Signature field

INDOT Pen Table_BW.tbl is automatically attached by the .set files as well, and controls the color table for finished prints. Please note that all these resources are tailored to use with the DOTWise system and are for the creation of PDF output only.

## 4.3     ProjectWise InterPlot Organizer's Plot Area Commands

By default, IPLOT plots to area of the drawing defined by the first numbered view that is turned on (views 1 through 8). Typically, this means that IPLOT will plot the portion of the drawing defined by view 1. However, views are imprecise and there is generally some white space around the outside of the desired plot area. (Border).

ProjectWise InterPlot Organizer provides several methods to define the plot area more precisely.

You can provide exact coordinates of the plot area.

You can direct IPLOT to fit the plot area to all elements or to a subset of the elements of the design file. This is useful if there are elements around the border that represent the cut lines of the design file.
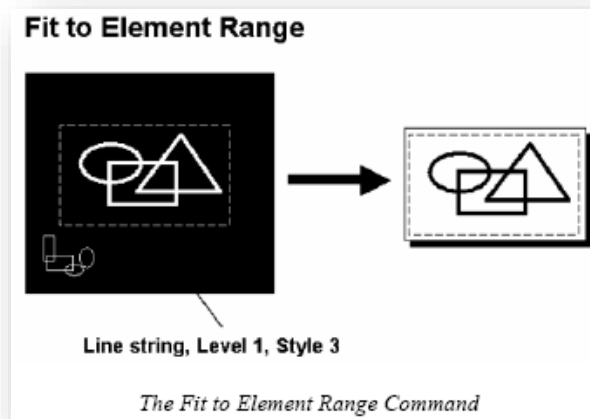


Fit to Element Range

You can direct IPLOT to search for a particular shape and use it as the plot area.  This is useful if there is a shape around the border or a shape that represents the cut lines of the design file.  This method is used for InRoads Sheets created by the DOTWise Workspace via the INDOT InRoads_XX_XX.set files.
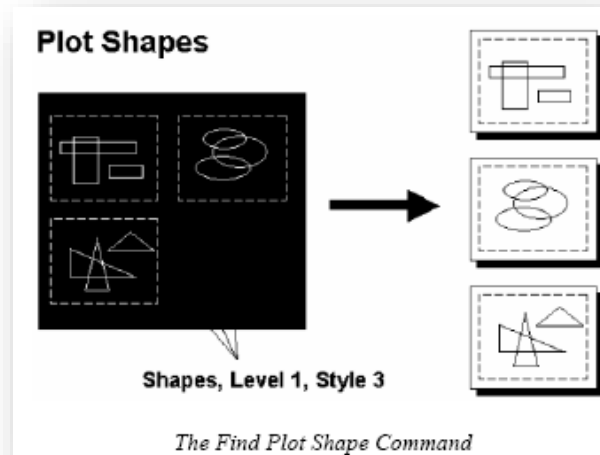


Plotting Shapes

You can also use IPLOT variables to define how DGN sheet definitions or Model extents to create plots, which is discussed in the next section.

### 4.3-1    Using IPLOT Search Variables

A major benefit to using these methods is the ability to quickly create a series of plots that may be contained within a single DGN file.  As part of this process, two variables are employed and discussed below.

#### 4.3-1a    Creating Plots Based on Sheet Defintions

This first method searches looks at creating a series of plots using sheet definitions.  At the time the plots are created in IPLOT, the variable can be appended as shown in order to search all the DGNs being plotted for Sheet Defintions, creating an individual plot for each instance found.

1.  Click on the Create Plots icon. 
2.  Select Sht Project.dgn, and then click Add, and then click OK.
3.  Under Manually specified options, click on MicroStation DGN files and then click Options.
4.  Under Plot area enable Sheet and under Search Models type IP_SHEETDEF_MODELS
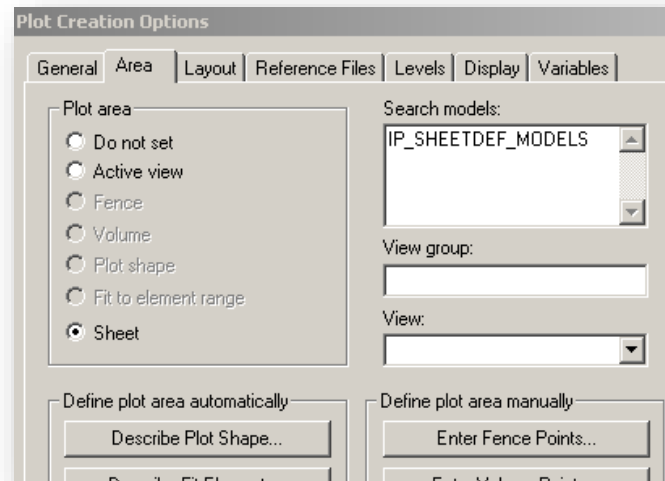
Using IP_SHEETDEF_MODELS

### *4.3-1b      Search Models Field Variables*

The following variable is used in the exact same fashion as the Sheet Definition variable from the previous section.  The difference being that this variable will create a plot based on each design model.  The variable is IP_DESIGN_MODELS.  In this instance care should be given to setting the appropriate extents after the plot is created as often the model will not have the desired extents as part of the active view which is used.

## 4.4      Creating an Electronic Signature

The use of Electronic Signatures through Adobe Acrobat has been in place at INDOT for quite a while; however we have taken steps to automate this process using ProjectWise InterPlot Organizer.  To ensure the security of the Electronic Signatures, INDOT will now be acting as a verification service for the Electronic Signatures.

Furthermore, CAD Support has inquired through the legal department of the Indiana Department of Transportation and has received approval from the following to move forward with the use of Electronic Signatures to sign plans at INDOT.

- INDOT Legal department
- Indiana State Board of Accounts
- Indiana Professional Licensing Board

### 4.4-1   Creating a .pdf of your Signature

*Note:  Before starting this process, you will need to determine where your Digital ID should be saved in a secure location that only you have access to.  One suggestion would be in your My Documents folder.  This will ensure that your Digital ID will be available to you as long as you are logged into the DOT domain.*

You will need to locate an INDOT photocopier that also scans images for this next exercise.  One that also sends the scanned image to you via email would be a best case scenario.

1. Navigate within ProjectWise to ... \Documents\Resources\Design Information\Electronic Signatures\Electronic Signature.pdf. (This folder contains the sheets on 8.5" x 11" paper that you use to scan your signature.)
2. Open (read only) Electronic Signature.pdf (This is an 8.5" x 11" print of the signature area on a large format (D+ 24" x 36") border sheet.



**PDF Electronic Signature Template**

Notice the faint yellow line in the signature area.  Your signature must be contained entirely within this area.  (Your signature should not cross the line above "DESIGN ENGINEER".

   o Print the .pdf onto an 8.5" x 11" sheet of paper, and then sign the printed piece of paper as you would sign a contract document.  Remembering to keep your signature within the now very faint box described in the previous step.  Some additional suggestions are:
   • Use a black pen, blue doesn't always cooperate in gray scale situations and can contribute to poor contrast with the finished product.
   • Use a fine point marker or felt tip pen.  Both will give the actual signature some weight that will transfer better when inserted/cropped/scaled.
   • Exaggerate the size of your signature.  This will also assist in visibility when it is inserted/cropped/scaled.
3. Locate a printer/copier with scanning and emailing capabilities.  Then scan and email the paper with your signature to yourself.
4. Open the .pdf that you previously scanned/emailed using Adobe Acrobat.  If you do not have Adobe Acrobat, you will need to locate a machine with this installed.   Please contact your supervisor and security coordinator should you require this software.
5. You may have to rotate the image so that it is orientated properly.  This can be accomplished using the Rotate View tool in Adobe Acrobat.
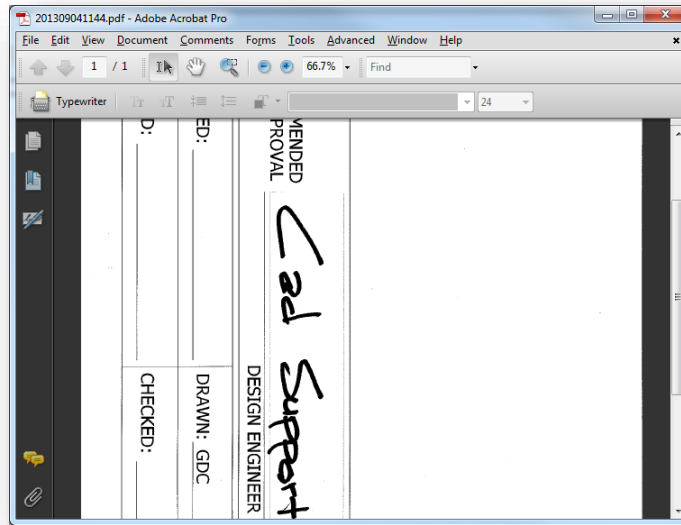
**Scanned PDF Signature**

6. Using the zoom tools, make your signature just large enough that you see it, and a portion of the surrounding data.  As shown below.
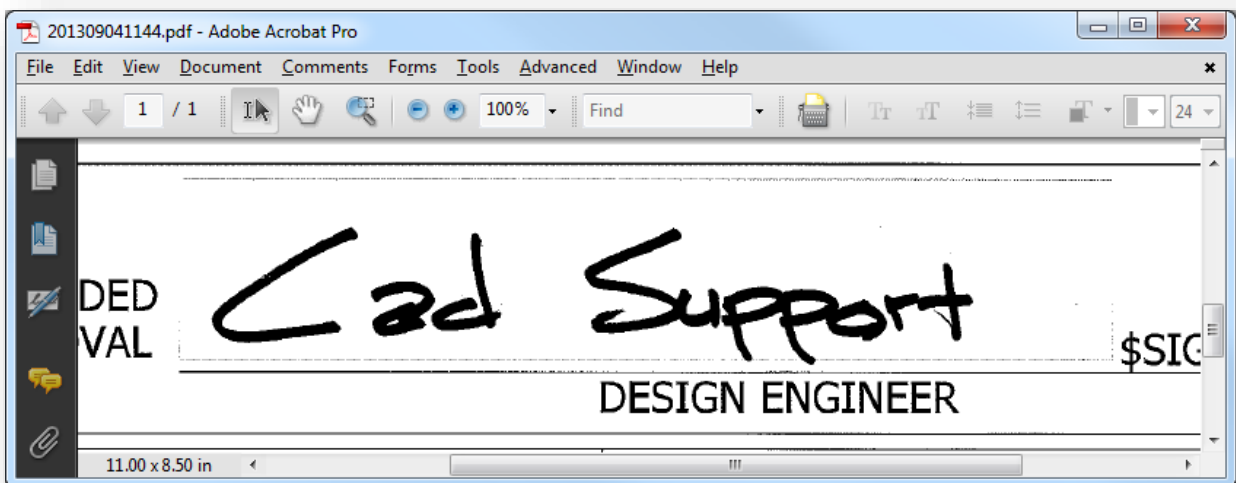


**Scanned PDF Signature**

7. In Adobe Acrobat Reader in the menu bar, go to *Tools > Advanced Editing > Crop Tool*.
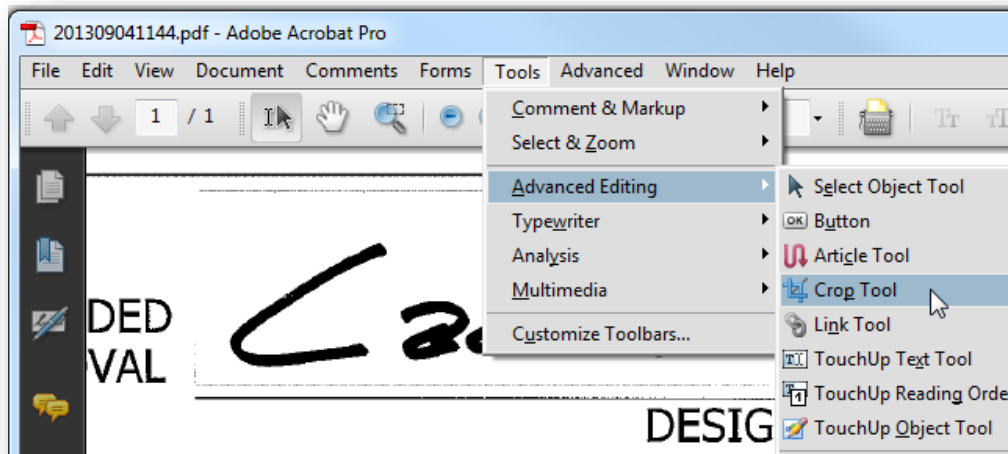
**Cropping the PDF Signature**

8. Draw a box around your signature by left clicking the mouse button and dragging the mouse. Try to get as close to the outline of the previously mentioned "faint yellow line" as shown in an earlier step in this exercise. If necessary, drag the corner handles of the cropping rectangle until the cropping rectangle is the size you want. Do not cross any of the elements in the border sheet.
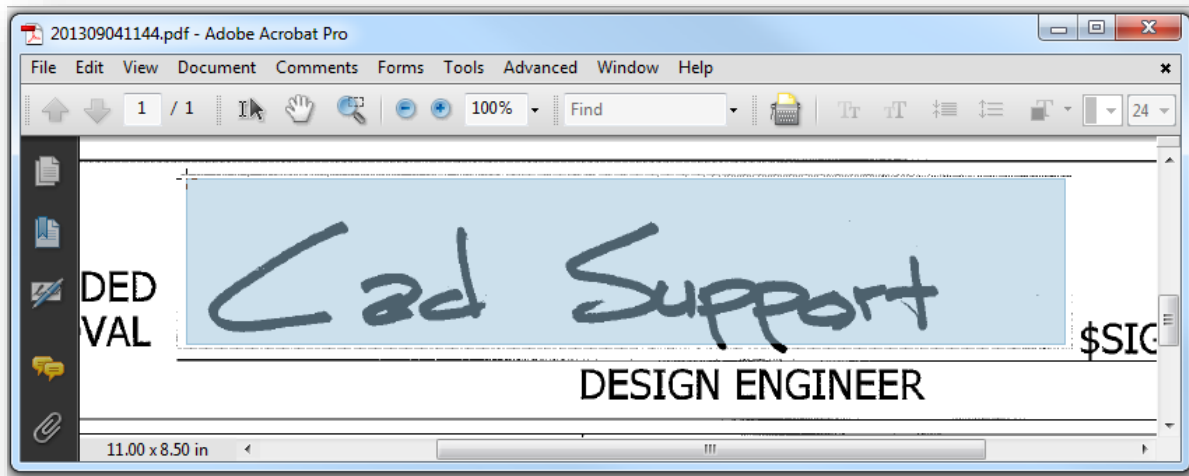


**Cropping the PDF Signature**

9.   Double-click inside the cropping rectangle.



**Cropping the PDF Signature**

10. This will open the Crop Pages dialog box.  Make sure that all of your options match those illustrated below except the margins which may differ for all users.
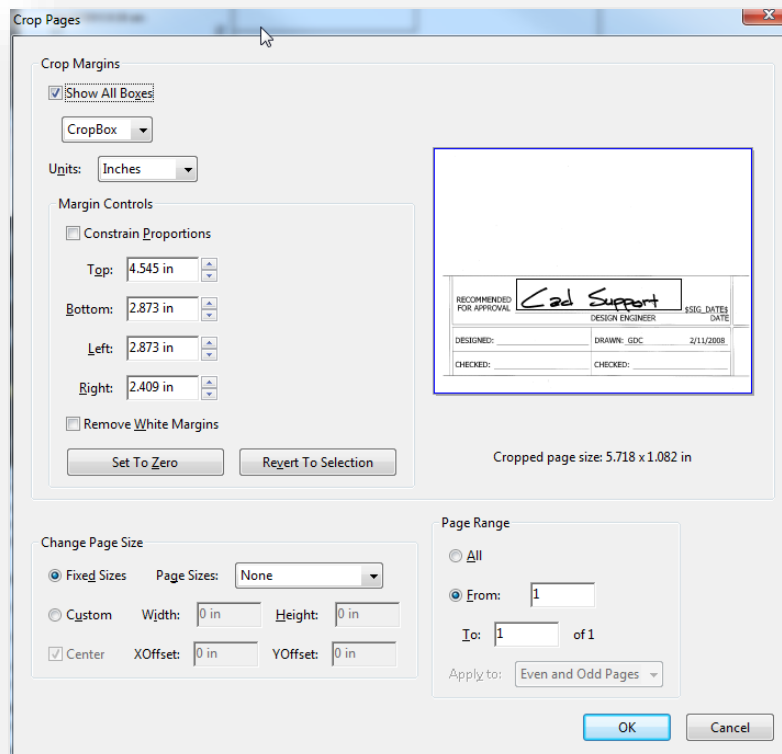


**Cropping the PDF Signature**

11. Click Ok.
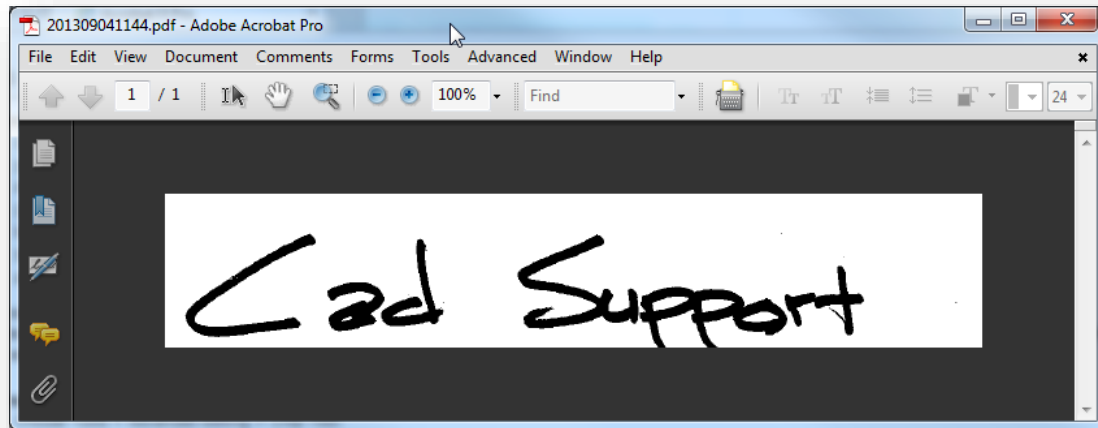


**The Finished PDF Signature**

12. Save the file making sure to place it in a location that meets the criteria listed in the note at the beginning of this series of exercises.

*Note:  When using Adobe Acrobat Professional 9, you will need to make sure that the background is turned on so that the electronic signature will cover the "this media not considered a certified document" text that is in the signature block on the border sheets.*

13. In Adobe Acrobat Professional 9 select *Document > Background > Add/Replace*
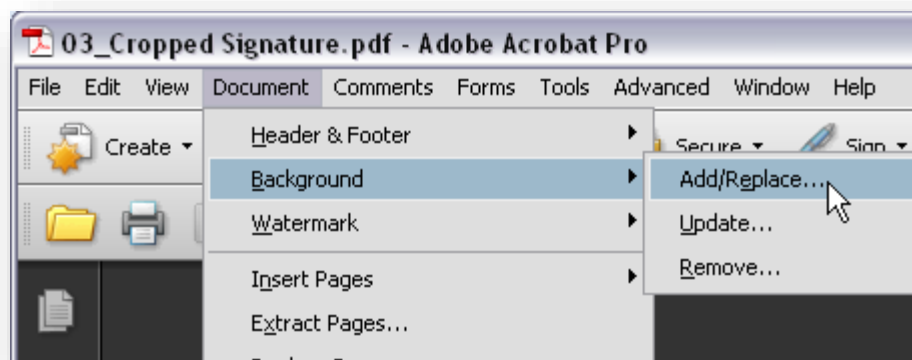


**PDF Signature Background**

14. Then, taking the default settings, click OK on the Add Background dialog box.

**PDF Electronic Signature Template**

Notice the faint yellow line in the signature area. Your signature must be contained entirely within this area. (Your signature should not cross the line above "DESIGN ENGINEER".)

- o Print the .pdf onto an 8.5" x 11" sheet of paper, and then sign the printed piece of paper as you would sign a contract document. Remembering to keep your signature within the now very faint box described in the previous step. Some additional suggestions are:
- Use a black pen, blue doesn't always cooperate in gray scale situations and can contribute to poor contrast with the finished product.
- Use a fine point marker or felt tip pen. Both will give the actual signature some weight that will transfer better when inserted/cropped/scaled.
- Exaggerate the size of your signature. This will also assist in visibility when it is inserted/cropped/scaled.

15. Locate a printer/copier with scanning and emailing capabilities. Then scan and email the paper with your signature to yourself.
16. Open the .pdf that you previously scanned/emailed using Adobe Acrobat. If you do not have Adobe Acrobat, you will need to locate a machine with this installed. Please contact your supervisor and security coordinator should you require this software.

17. You may have to rotate the image so that it is orientated properly.  This can be accomplished using the Rotate View tool in Adobe Acrobat.
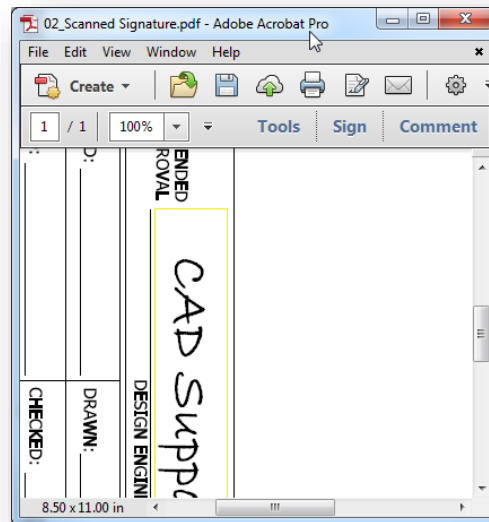


**Scanned PDF Signature**

18. Using the zoom tools, make your signature just large enough that you see it, and a portion of the surrounding data.  As shown below.
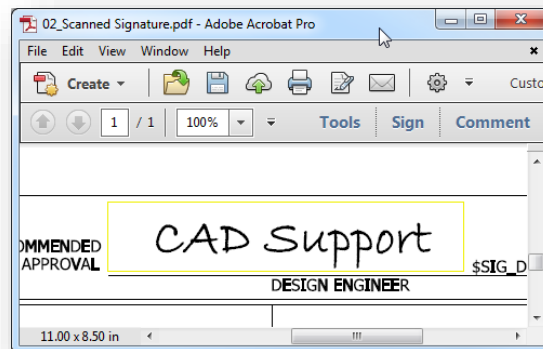


**Scanned PDF Signature**

19. Make sure that you have Default Tools Selected.
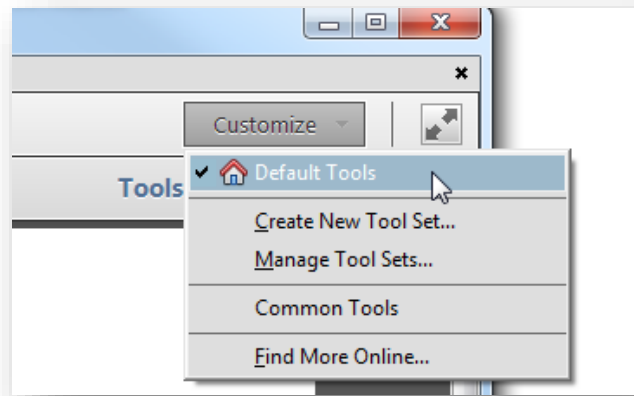


20. In Adobe Acrobat XI Pro, in the menu bar, go to *Tools > Pages > Crop*.
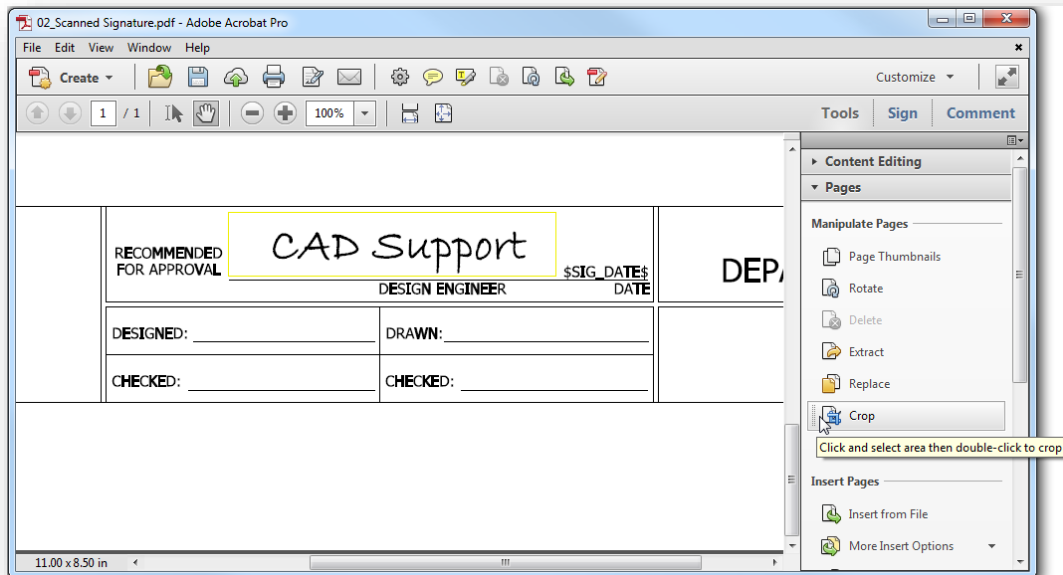


**Cropping the PDF Signature**

21. Draw a box around your signature by left clicking the mouse button and dragging the mouse. Try to get as close to the outline of the previously mentioned "faint yellow line" as shown in an earlier step in this exercise. If necessary, drag the corner handles of the cropping rectangle until the cropping rectangle is the size you want.  Do not cross any of the elements in the border sheet.
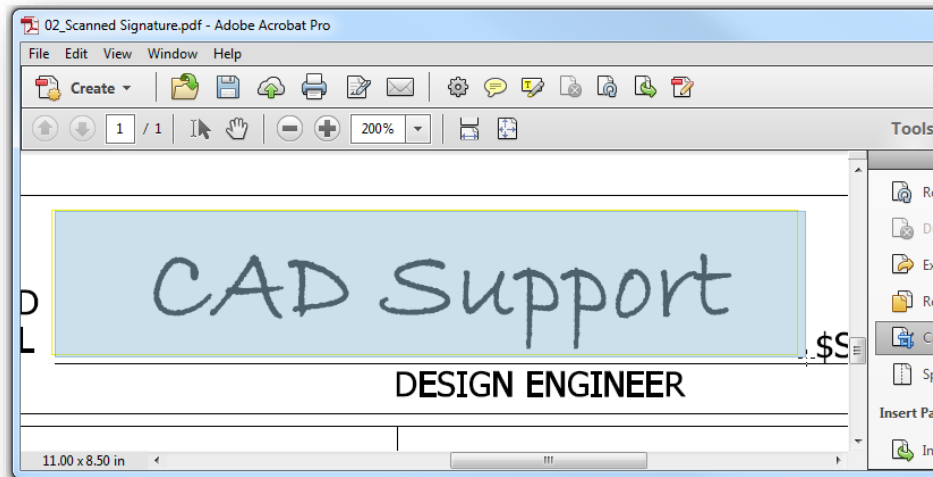


Cropping the PDF Signature

22. Double-click inside the cropping rectangle.
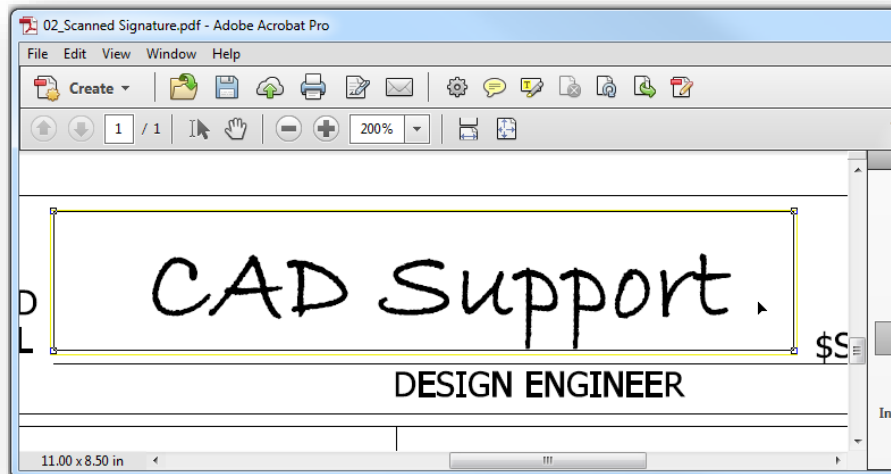


Cropping the PDF Signature

23. This will open the Crop Pages dialog box.  Make sure that all of your options match those illustrated below except the margins which may differ for all users.
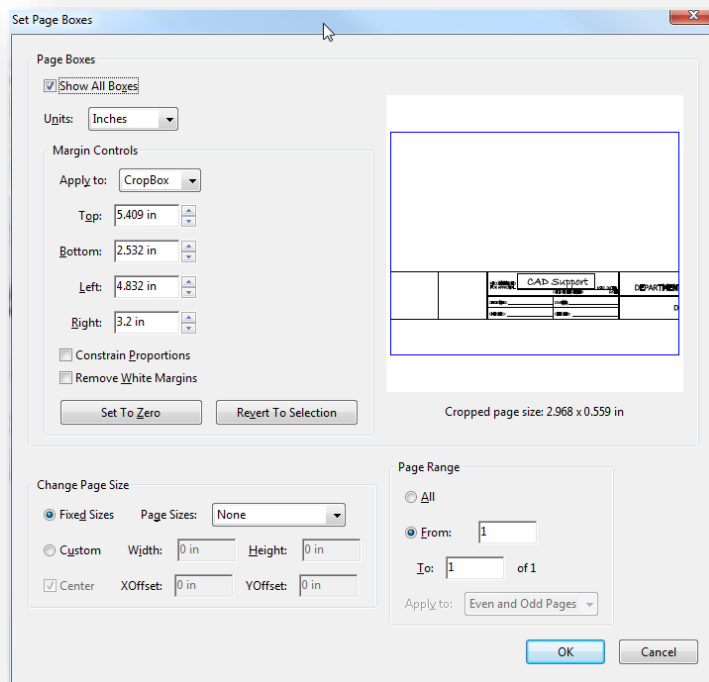


**Cropping the PDF Signature**

24. Click Ok.
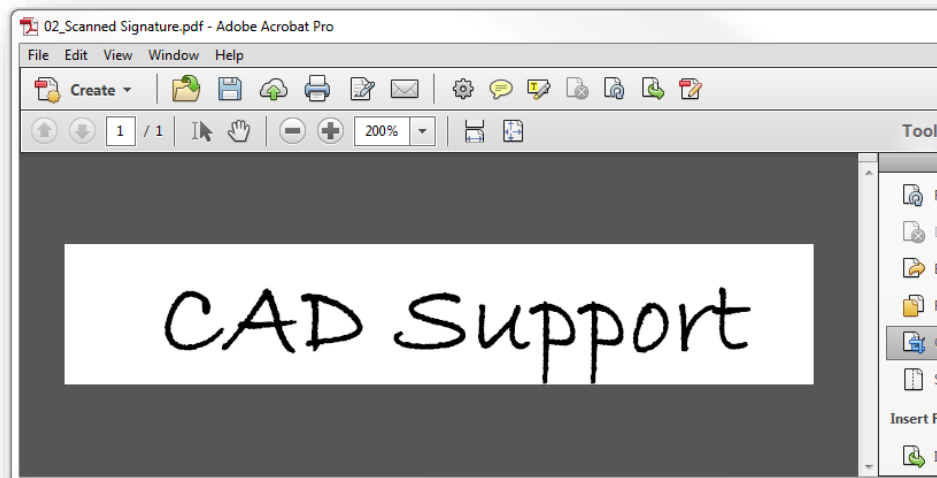


**The Finished PDF Signature**

25. Save the file making sure to place it in a location that meets the criteria listed in the note at the beginning of this series of exercises.

*Note:* *When using Adobe Acrobat Xi Pro, you will need to make sure that the background is turned on so that the electronic signature will cover the "this media not considered a certified document" text that is in the signature block on the border sheets.*

26. In Adobe Acrobat XI Pro, select *Tools > Pages > Background > Add Background*
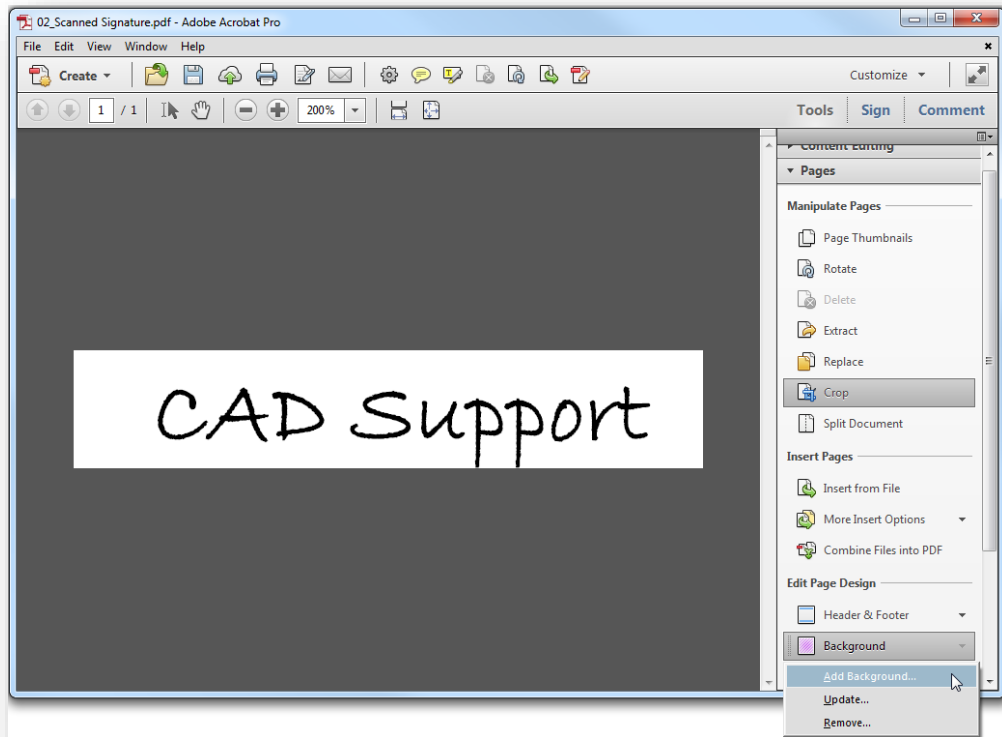


**PDF Signature Background**

27. Then, taking the default settings, click OK on the Add Background dialog box.
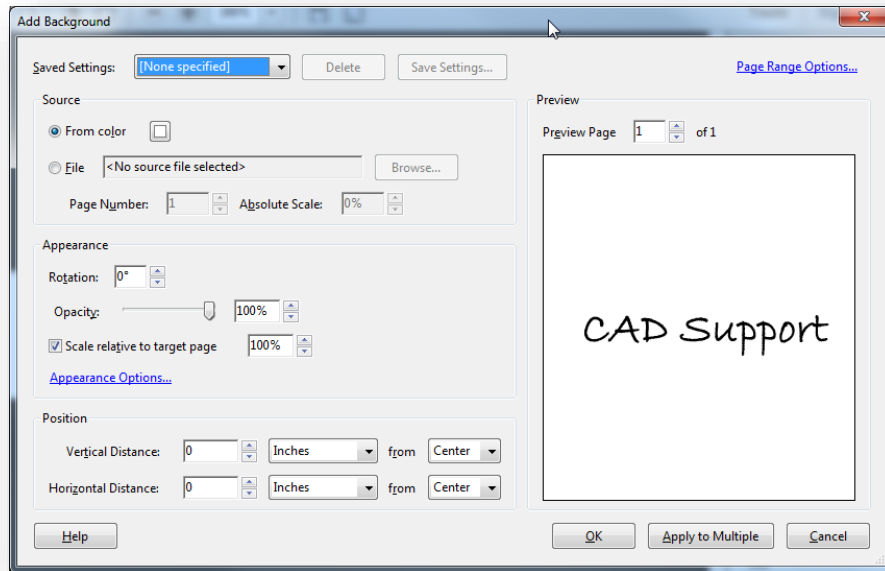


**PDF Signature Background**
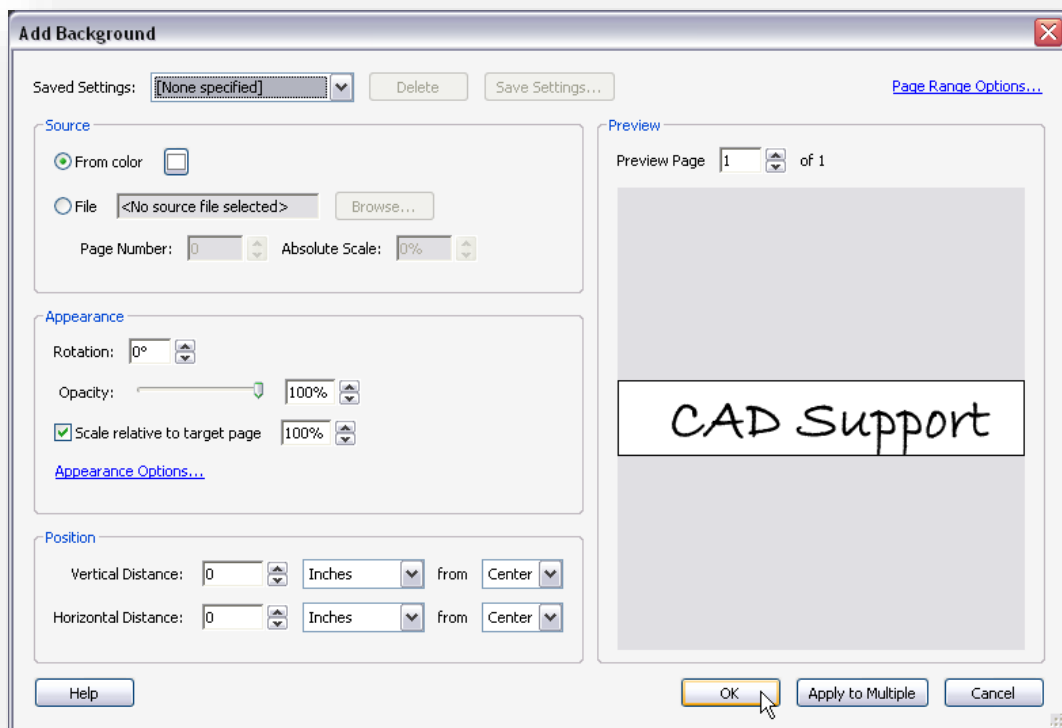


**PDF Signature Background**

### 4.4-2  Creating an Electronic Certificate

Once you have created a .pdf version of your signature, you then need to create a secure certificate to use to manage your signature.  Once created, the certificate will be stored by you in a secure location and you will be required to send the CAD Support staff a version of your certificate so that we may store it in a secure location in ProjectWise, should there be a need to either verify your signature or replace a lost (deleted) local copy.  This can be done using either Adobe Acrobat Professional or Acrobat Reader.

1.  In the Adobe Acrobat Professional tool bar select *Edit > Preferences*.
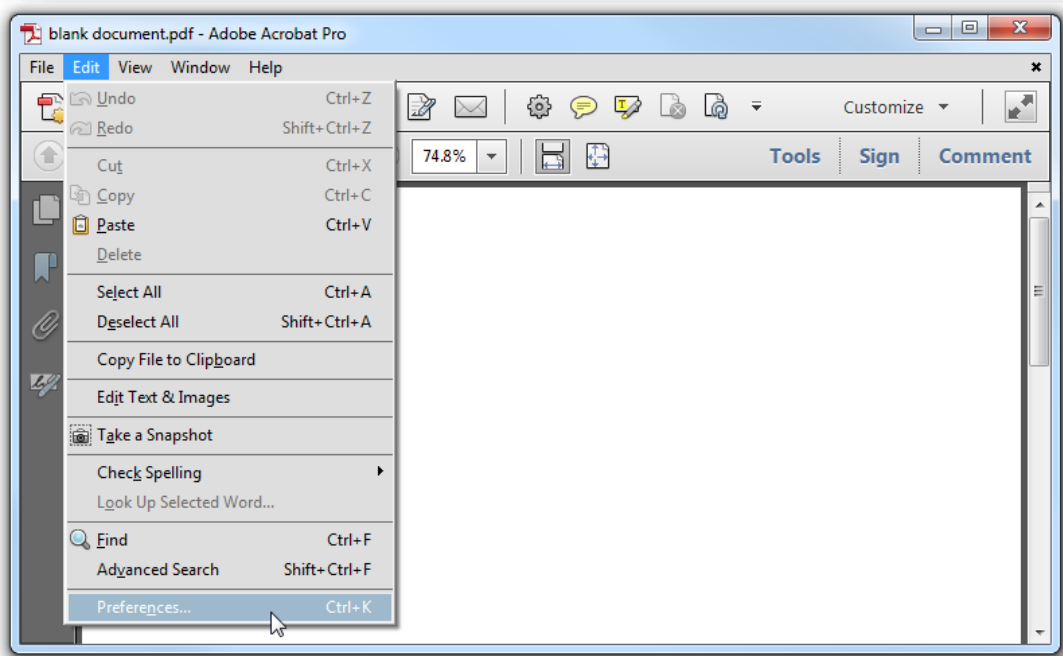
Creating the Electronic Signature

2. In the left column of the Preferences dialog box select Signatures and then click More in the Identities & Trusted Certificates area of the dialog box.
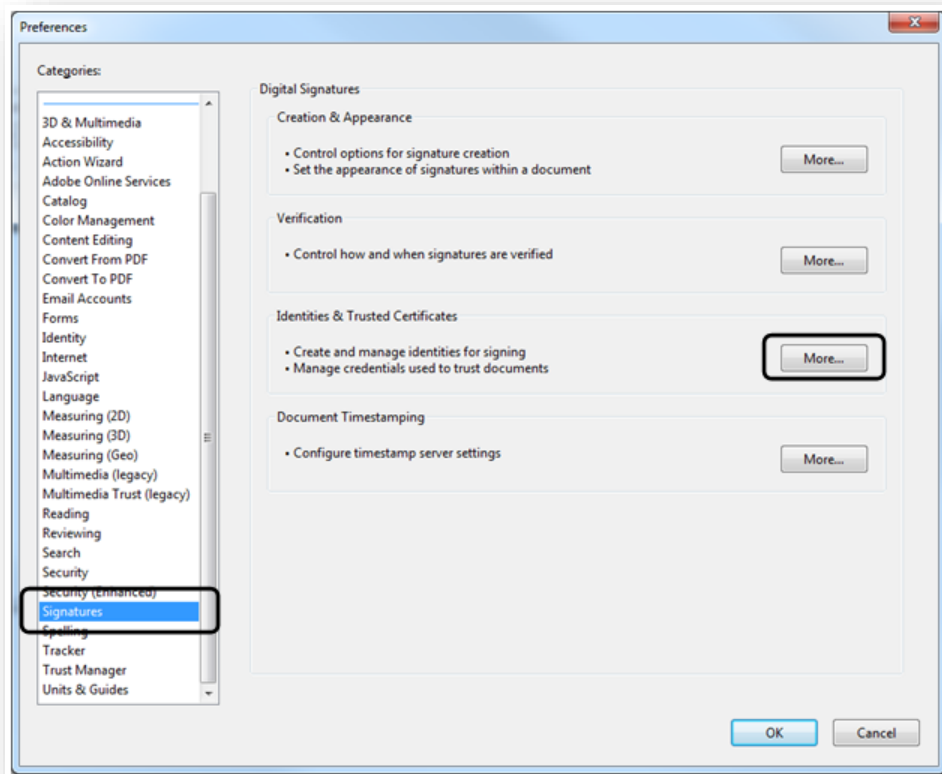


3. In the left column of the Digital ID and Trusted Certificates Settings dialog box select Digital ID, and then click Add ID.
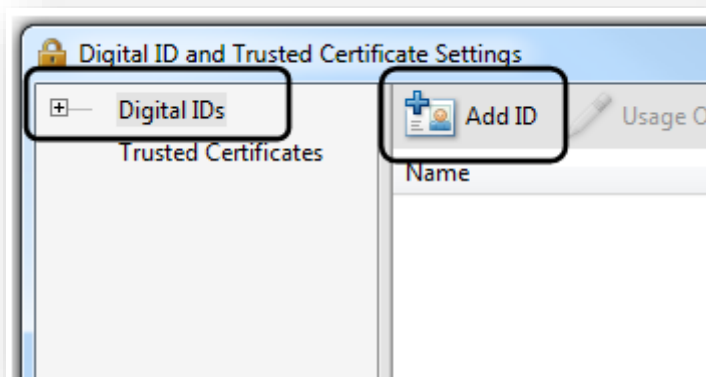


**Creating the Electronic Signature**

4. In the Add Digital ID dialog box, select *A new digital ID I want to create now*, and then select the Next button.
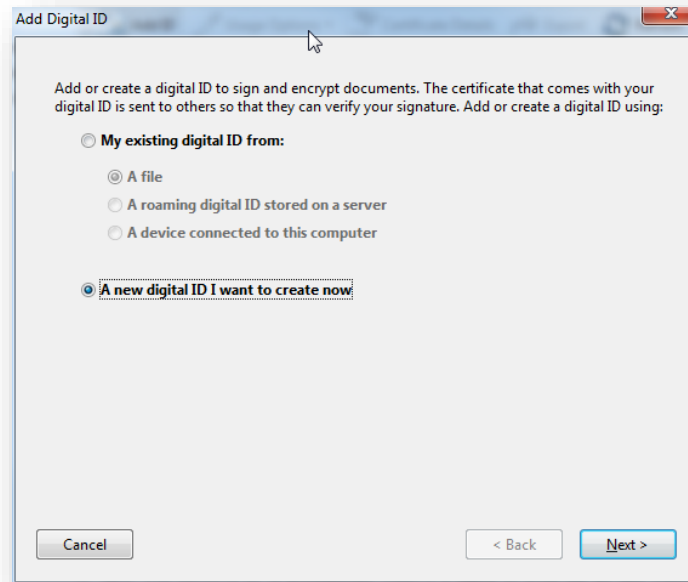


**Adding the Digital ID**

5. Select the New PKCS#12 Digital ID File and then select the Next button.
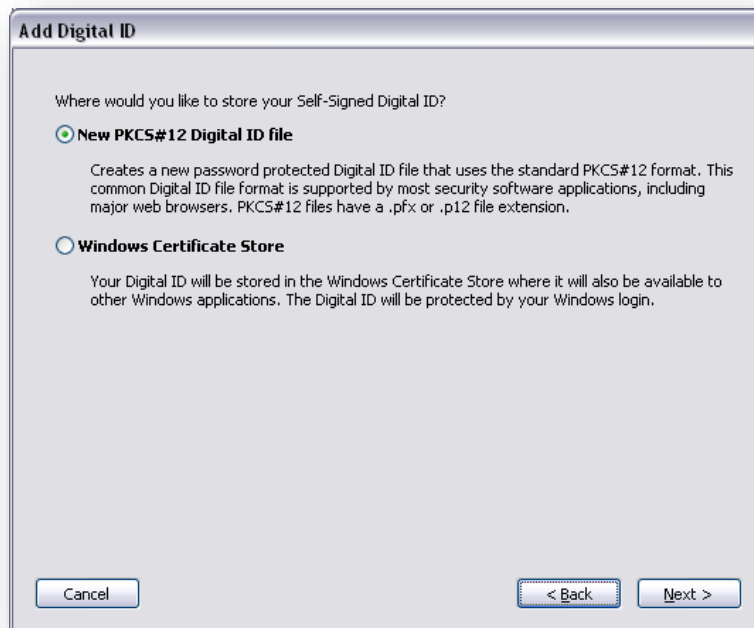


**Adding the Digital ID**

6. Fill out the dialog with the appropriate information.  The Organization Unit should be your District and Division. (i.e..... CO – Roadway Services, CO – Structural Services, Vincennes Design, Seymour Design...)



**Adding the Digital ID**

7. Now you will need to save the Digital ID.   Make sure to place the file into a location that meets the criteria described in the note at the beginning of this series of exercises.
When saving the PFX file (Digital ID), make sure you use the following file naming convention. Date is necessary in the event another Digital ID is created in the future.  The Adobe version is important for compatibility reasons.

*Userid_YYYYMMDD_ver.pfx  [CADSupport_20140319_XIprof.pfx]*

You will need to create a password that you will use every time you apply your Digital ID. Don't forget your password or you will need to create a new Digital Id.  The password has to be a minimum of 6 characters and it is case sensitive.
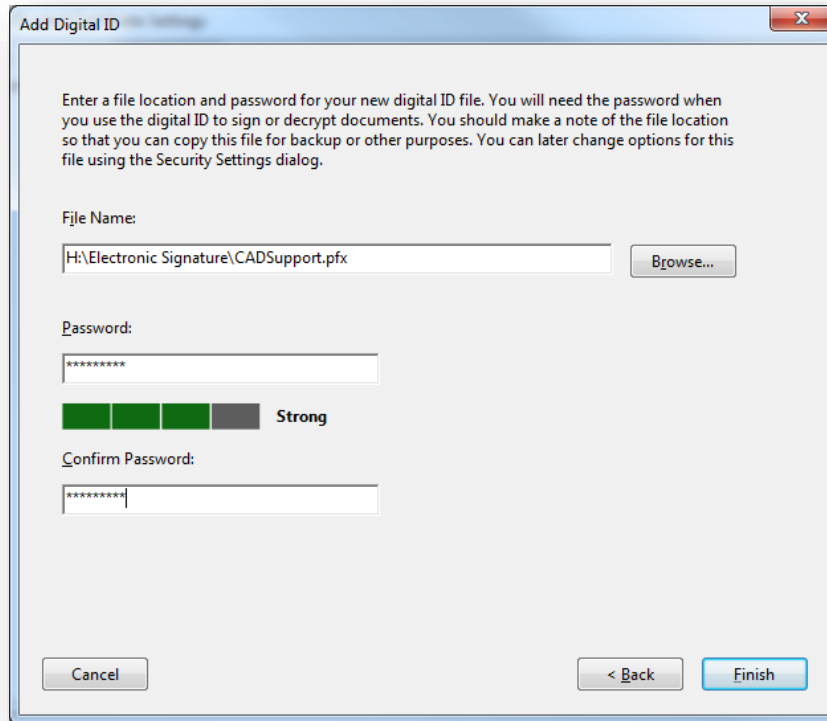
**Adding the Digital ID**

8. Select Finish.

9. Now, highlight your name and select the Export option.  The file created in this can be used to validate your Digital ID.
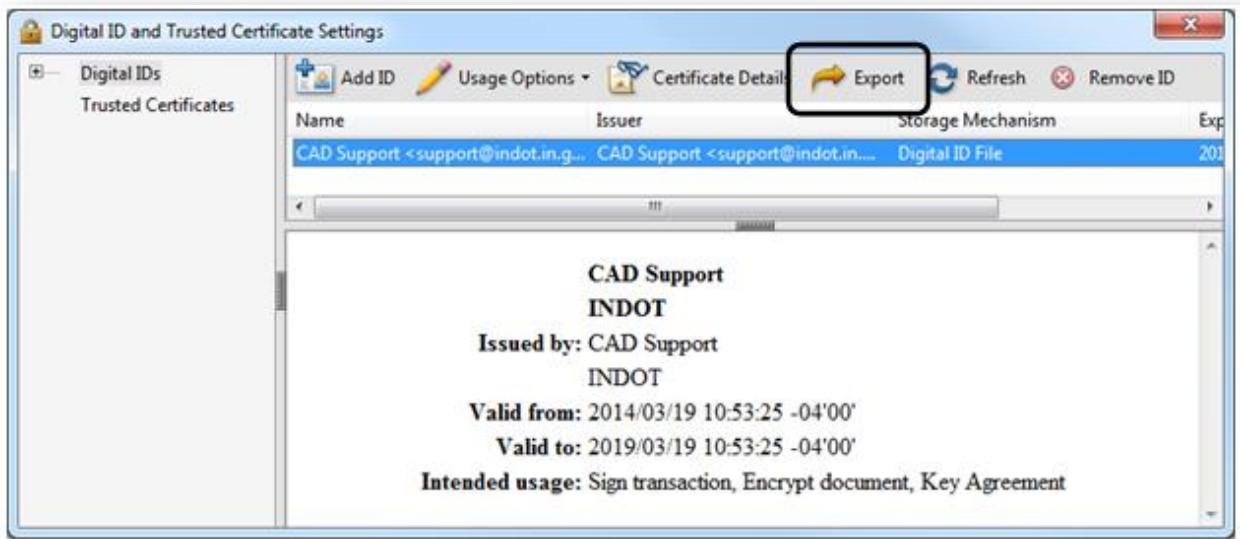


**Exporting the FDF File**

10. Select the Save the data to a file option and click *Next*.



**Exporting the FDF File**

11. When saving the exported file, make sure that the path is to the same location as your Digital ID.  The Save As type should be set to Acrobat FDF Data Exchange.  Be sure to use the same naming convention that was used for the Digital ID.

   *Userid_YYYYMMDD_ver.pfx  [CADSupport_20140319_XIprof.fdf]*
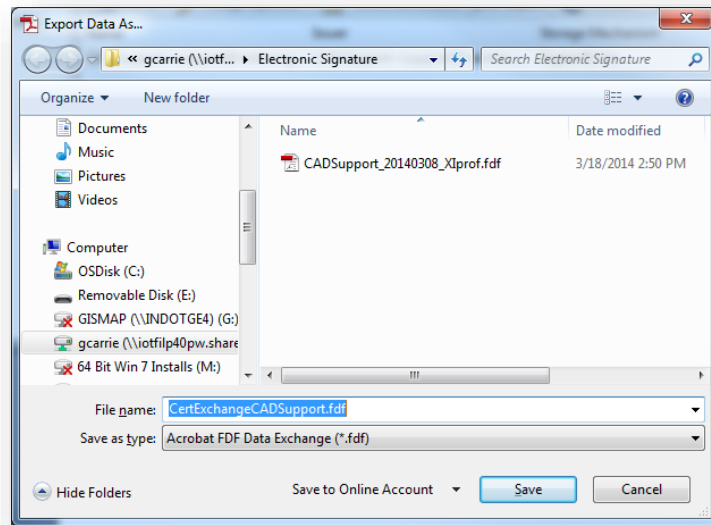


Exporting the FDF File

12. Now that you have created a certification file to validate your Digital ID, you will need to email that .fdf file to INDOT CAD Support (indotcadsupport@indot.in.gov).  INDOT will then be the holder of this file to validate any contract plans that you have signed electronically.  The .fdf file will be kept in a secure location within ProjectWise where it cannot be altered in any way.
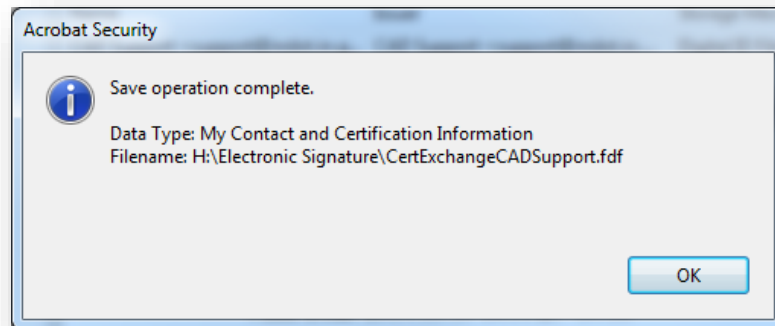


Exporting the FDF File

*Note:  If you would like for CAD Support to store a copy of the .pdf of your signature, make sure to forward a copy of the .pdf at the same time that you send the copy of your .fdf file.*

### 4.4-3 Combining the Electronic Components

Now, using either Adobe Acrobat Professional or Adobe Acrobat Reader, you will need to combine your Signature and Certificate.

1. Click More in the Creation & Appearance area of the Preferences dialog box.



Combining the PDF & FDF Signatures

2. In the Appearances area of the Creation and Appearances Preferences dialog box, click New.
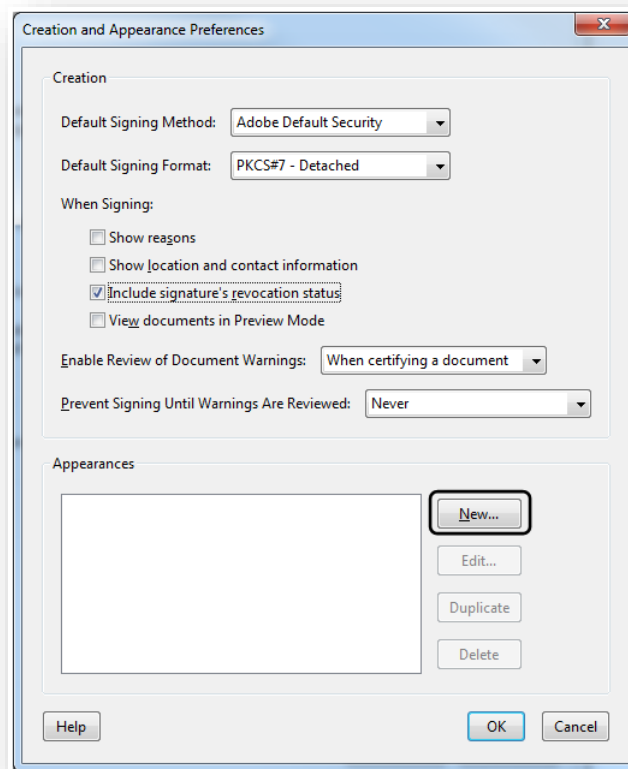


Combining the PDF & FDF Signatures

3. This opens the Configure Signature Appearance dialog box.  Configure this dialog as described below.
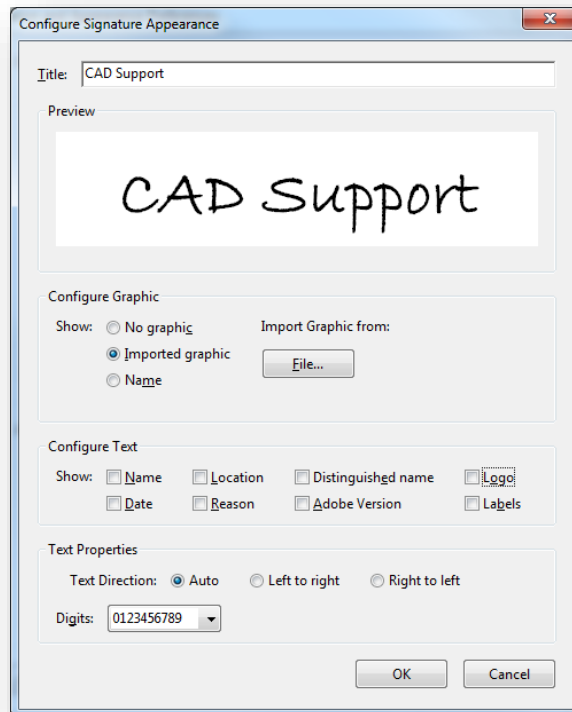


**Combining the PDF & FDF Signatures**

- *Title*: Use the name that you use in your signature.
- *Configure Graphic*:  Select Imported Graphic and select the File button.  Browse to the location that you stored the .pdf of your signature.
- *Configure Text*:  Disable all!  We will use the functions of IPLOT to fill in the date.
- *Text Properties*: Use the default selection.

4. Now you have created you Electronic Signature.  Click the OK button.

5. Click on the Ok button on the Creation and Appearances Dialog box, this will take you back to the Preferences dialog box, Select OK.
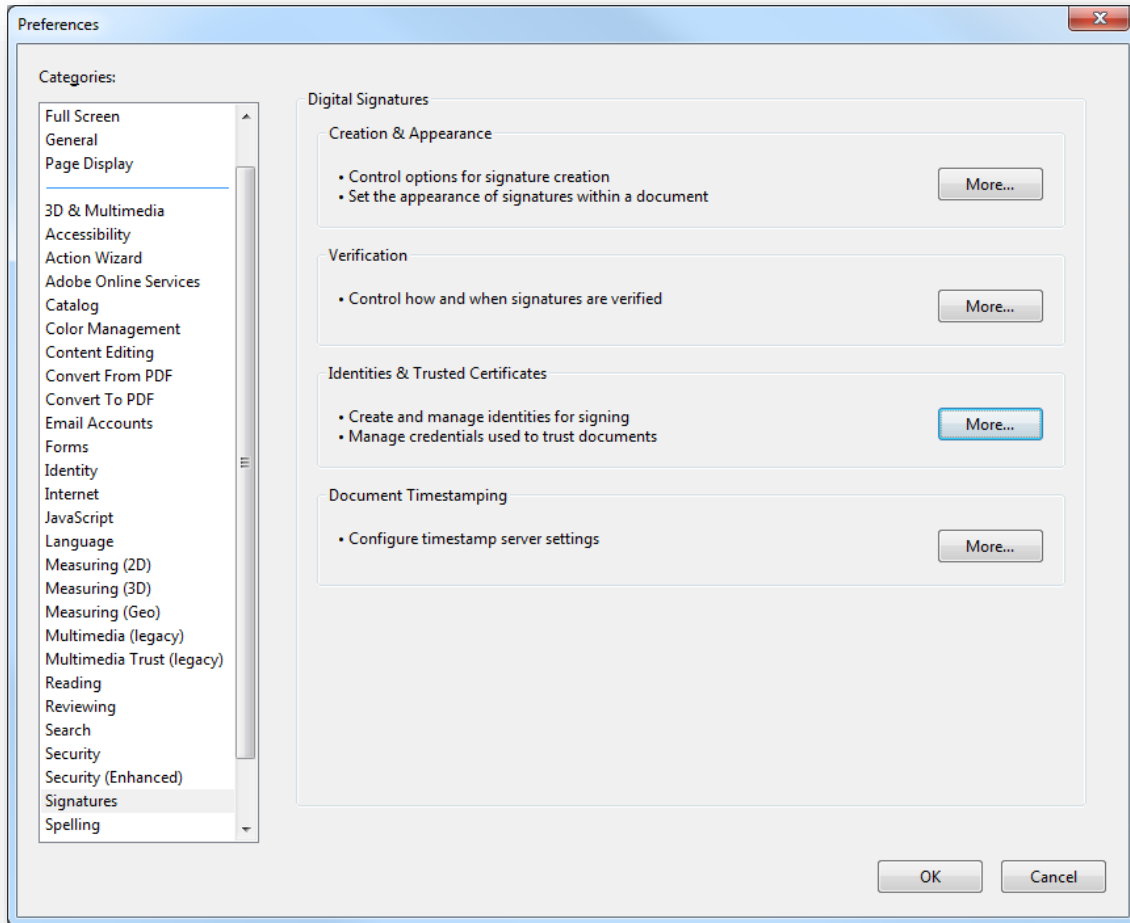
An Available Electronic Signature

Discussion on how to use this Electronic Signature will be discussed in the Enhanced Plotting section of this document.

## 4.5    Using Electronic Signatures

### 4.5-1    Overview:

As mentioned at the front of this chapter, the use of Electronic Signatures has been approved and is in use by INDOT.  Note that the Electronic Signature is not placed on every sheet in the document but is used to electronically sign and seal the entire plan set.  If, after placing the Electronic Signature any page within the .pdf plan set is altered in any way, the Electronic Signature will appear with a broken indicator.

### 4.5-2    "Signing" sheets within the plan set

Per the approval INDOT has received, it has been determined that a graphic representation of the Engineers signature responsible for each sheet within a plan set is acceptable.  Therefore an interface has been provided for the purpose of signing the sheets within a plan set.  This can be done either individually or as a group function.

*Placing the Graphic Representation of a Signature on individual Sheets:*

1. In ProjectWise Explorer, Set your interface to _Signature
2. Select the properties of the MicroStation file that you want to place the Graphic Representation in.
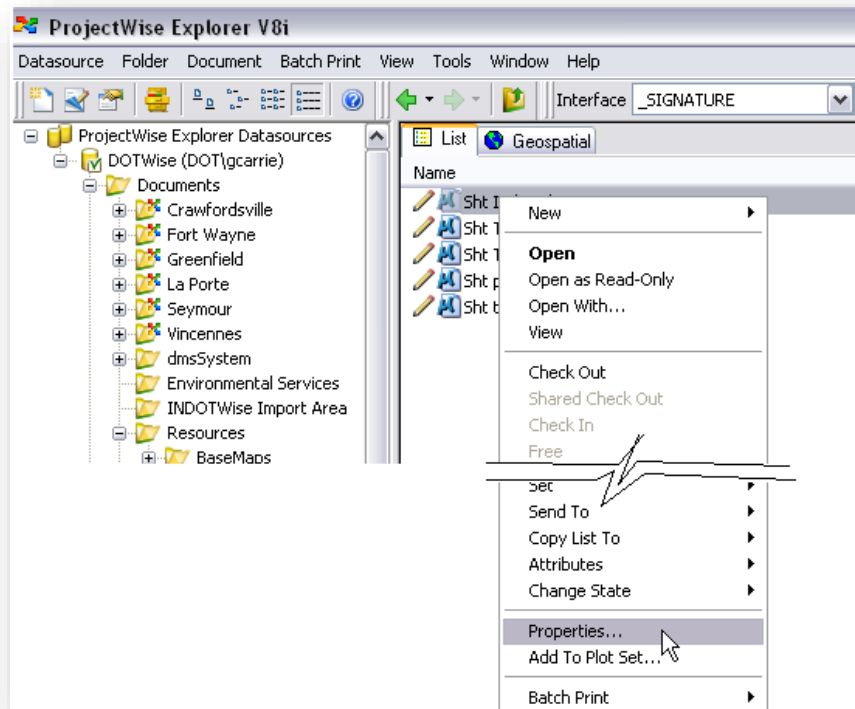


**Setting Document Properties**

3. Select the Attributes Tab of the Document Properties dialog Box and place the Name of the Responsible Engineer and the Date.

__Signature Interface in ProjectWise

4. The Graphic Representation of the signature will be placed on the sheet model using a script type font.



Printed PDF Signature (prior to Signing)

### 4.5-3   Placing the Graphic Representation of a Signature on Multiple Sheets

1. In ProjectWise Explorer, Set your interface to _Project Properties
2. Select the properties of the MicroStation files that you want to place the Graphic Representation in.
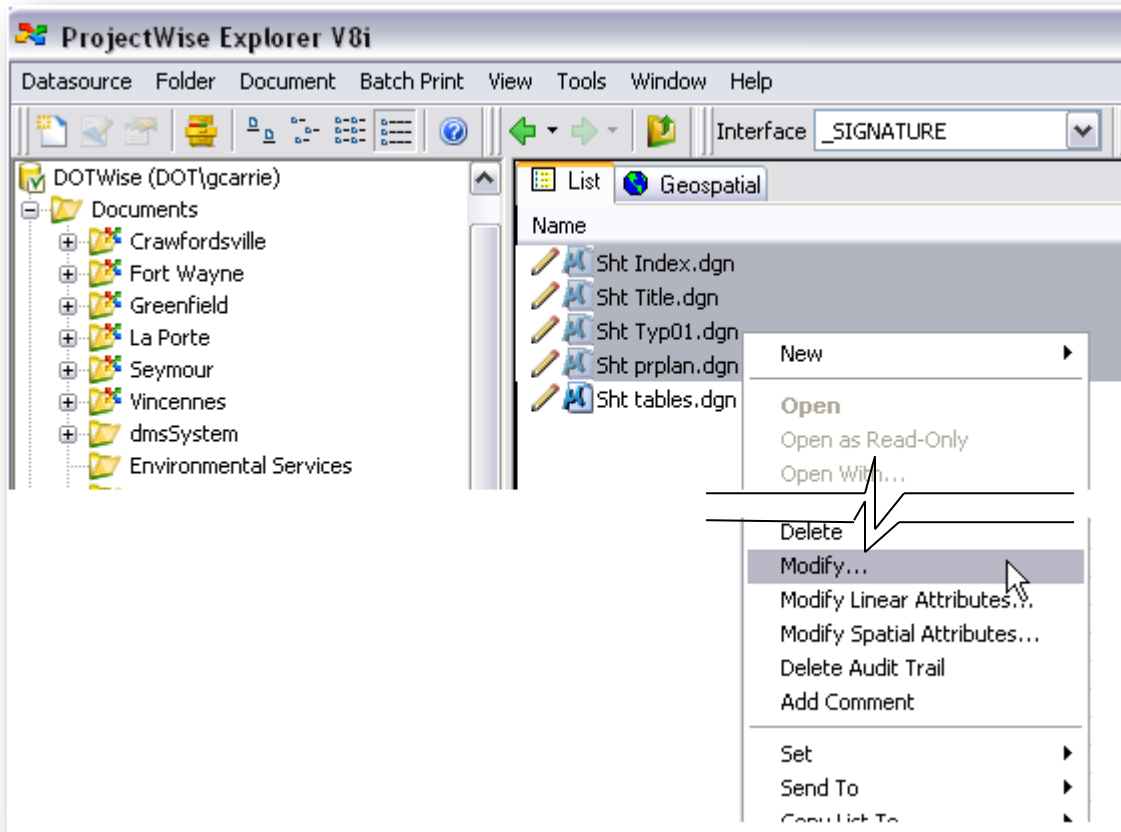
**Modifying Multiple Document Properties**

3. Select the Plan_Production tab on the modify documents dialog box and scroll down to the entries for "SIG_DATE" and "SIGNATURE".

**Modifying Multiple Document Properties**

4. Place the name of the Responsible Engineer and date, and then select apply.
5. The Graphic Representation of the signature will be placed on the sheet models using a script type font.



RECOMMENDED
FOR APPROVAL  *Gregory D. Carrie*
                                                          06/08/2009
                                DESIGN ENGINEER                      DATE

**Printed PDF Signature (prior to Signing)**

### 4.5-4 Electronically Signing the Plan Set

The plan set (.pdf) will be signed using the Responsible Engineer's Electronic signature after the plot had been created using ProjectWise InterPlot Organizer.  This is accomplished by using one of the new design scripts provided.

1. Create your plot set (.ips file) using one of the design scripts discussed in section 4.4 of this document.
2. Export the .pdf file and open using either Adobe Acrobat Professional or Adobe Acrobat Reader.
3. Open the Title Sheet and notice in the "Certified by" area, text stating that "THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT".   This text is in place to ensure that the reviewer knows that the plan set has not yet been signed by the responsible engineer. This text is in place on both the letter size and 24" x 36" title sheets.



**Unsigned PDF Document**

4. To electronically sign the plan set, the responsible engineer can simply left mouse click on the colored tab above the text mentioned in the last step.  This should activate the This Document Is Not Certified dialog.  To sign the document select "Continue Signing".
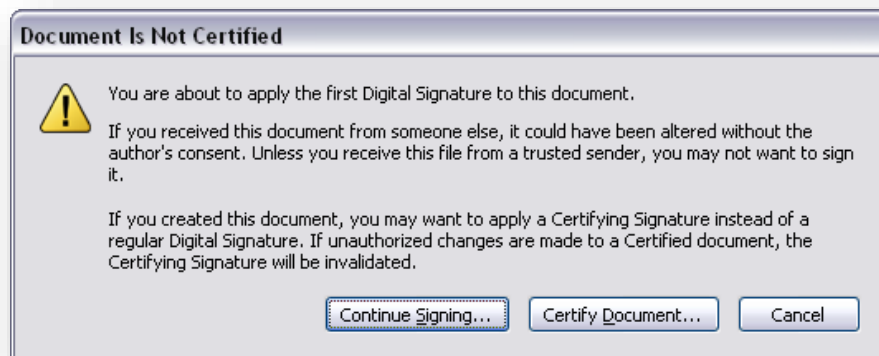


**PDF Document Signing**

5. This will activate the "Apply Signature to Document" dialog box.  Fill this form out as you see fit.  Then after using the password that you chose when you created your Digital ID (4.2 step 7), select Sign and Save.

**Applying the Electronic Signature**

6.  The "Apply Signature to Document" dialog is activated.  Select OK and review your signature on the plan set.



**Signature Confirmation**

**A Finished Electronic Signature**

7.  Notice that the date is populated when the .pdf is created from ProjectWise InterPlot Organizer.

### 4.5-5   Verification of Signatures

If the need to verify a signature arises, CAD Support will be able to provide the appropriate files for verification.

# 5. InRoads and ProjectWise

Unlike MX, InRoads is fully integrated with both MicroStation and ProjectWise. As such, CAD Support is now able to provide InRoads configurations, and template files within the managed ProjectWise environment. Throughout the document, specific functionality of InRoads with ProjectWise will be called out and expanded on in a workflow specific manner.

## 5.1 InRoads Standards and Seed Files

This section will discuss the location of INDOT specific InRoads standards and seed files for use with the application. All InRoads files except DGN seed files will be found under folders within the following ProjectWise path pw:\\dotwise.indot.in.gov:DOTWise\Documents\INDOT Workspace\InRoads\

### 5.1-1 XIN File

The INDOT configured XIN file can be found in under the XIN folder and is named INDOT.xin. This file contains many of the INDOT specific customizations for the look and feel of features such as topographical items, alignments, profiles, etc. It also contains preferences for a wide variety of functions including stationing, curve sets, cross sections, and plan and profile sheets along with many other INDOT specific functions.

### 5.1-2 INDOT Specific Preferences

Within the XIN, there are numerous tools that have preferences configured for items and functionality specific to INDOT. When you see the following button when using an InRoads tool, it is recommended to check within and see if there's an INDOT specific setup:
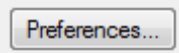


Preferences Button

When inspecting the preferences, you may see a wide variety of preferences for differing situations. The following illustration shows the preferences defined for the View Contours tools:
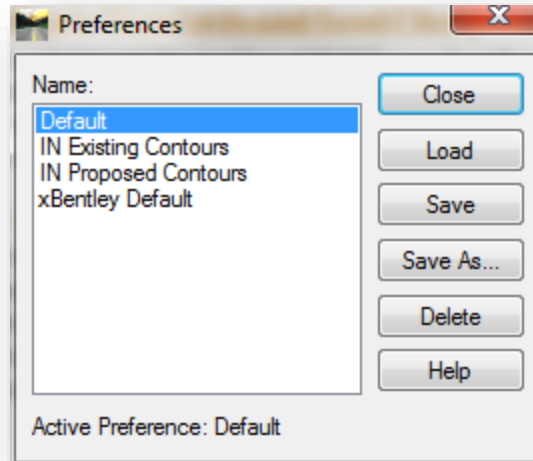
**View Contours Preferences**

The naming convention for preferences is as follows:

- Default - A predefined preference. For many tools, this may be setup to be the same as the most commonly used INDOT preference.
- IN ... – An INDOT specific preference.
- IN PW ... - An INDOT specific preference requiring a connection to DOTWISE to use.
- xBentley Default – The default preference as defined by Bentley, in most cases this should not be used.

### 5.1-3   ITL File

At the current time, there are no configured InRoads templates specific to INDOT. As feedback is received on default templates, they will be provided under the RMTemplates folder. Currently, CAD Support has provided the template library that was configured for use with the Advanced Roadway Designer course as an example for prospective point naming and usage scenarios.

### 5.1-4   Cell libraries

All INDOT cells for use with InRoads can be found under the Cells folder. There are currently two cell libraries in use under this folder:

- INDOT Aerial Engineering InRoads Cell Library.cel
- INDOT_InRoads.cel

The first library is used by the Aerial Survey group for topographical collection. The second library is used for the display of point features in the topographical surface.

### 5.1-5   Plans Production

The files located under Plans Production are used in the creation of cross sections and sheet created using the Plan and Profile Generator. Discussion of these files will be expanded with their usage in the Plans Production workflow.

### 5.1-6    InRoads DGN Seed Files

InRoads functions differently from MX in that any DGN or model in a DGN can be a container for InRoads elements at any time.  As such, the first item required when starting an InRoads project is the appropriate unit DGN seed file.  For all new projects that are created after the Fall 2103 release of the Indiana Design Manual Part 1, Ch. 106, Section 26-1.01 memo requiring Geo-Coordinated seed files, you will be provided a Survey seed file in the pw:\\dotwise.indot.in.gov:DOTWise\Documents\District\Des No.\ Survey\Project Files  folder of your project with the following naming convention: Des #_SRxxSeed.dgn.  This seed file sets the coordinate system for every InRoads based file in your project.  The file will already have the properly selected working units for your project.  If you are a consultant working on an INDOT project and do not have access to the Survey\Project Files folder, please contact your Surveyor to request the newly required geo-coordinated seed file.

Your project might fall outside the requirement window of the new design memo so you may continue to use the previous method of creating your own seed file (or possibly ask the Surveyor if they can create one for you).  The files you will need are located with the rest of the INDOT specific ProjectWise seed files.  They can be found at pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\InRoads\.

At the root of this location, 3 seed files have been provided, corresponding to the various units of measurement used in INDOT.  These are:

- INDOT_US_SVFT_seed.dgn
- INDOT_US_seed.dgn
- INDOT_SI_seed.dgn

As InRoads is compatible with the US Survey Foot standard and Survey has requested its availability, US seed files are provided in both Survey Foot (INDOT_US_SVFT_seed.dgn) and International Foot (INDOT_US_seed.dgn) varieties.

As with MX, these files are configured with Design History disabled to remove compatibility errors caused by the rapid display and deletion of elements during the design process.

Finally, as InRoads is integrated with ProjectWise, these seeds are configured with their application association set to InRoads Suite causing the full InRoads application to launch when the files are checked out and opened.  To disable this functionality, perform a Document -> Properties (Space Bar shortcut) on the document in ProjectWise.  When presented with the document properties panel, you can then adjust the application association as shown:
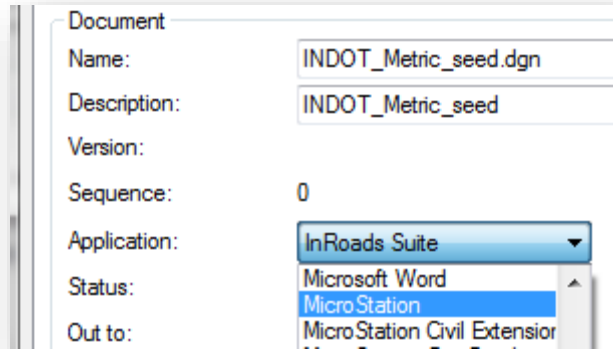
**ProjectWise Application Association**

## 5.2    Working with InRoads

### 5.2-1    ProjectWise

#### 5.2-1a      Project Creation

The first step in working with InRoads and ProjectWise is the creation of your project.  At this time, the MX folder in the Design project template has been replaced with an InRoads folder.  As always if your project does not yet have a design folder, or has an MX folder currently, and you'd like the InRoads folder, please request the project/folder created through a help ticket.  The remainder of your folder structure under the design project remains the same at this time.

#### 5.2-1b      Survey Provided Files

When starting an InRoads project, you can expect having access to the following InRoads and MicroStation files and a brief synopsis of each:

1. Des #_SRxx Control Points.fwd – InRoads survey book with control points
2. Des #_SRxx LCRS Plat.dgn – MicroStation plat DGN
3. Des #_SRxx Survey Alignment.alg – InRoads Survey Alignments
4. Des #_SRxx Survey Surface.dtm – InRoads DTM of Survey processed features
5. Des #_SRxx Survey Surface Boundary.dtm – InRoads DTM of Survey Boundary
6. Des #_SRxx Survey.xin – InRoads XIN, specific to the processed data
7. Des #_SRxx Topo.dgn – MicroStation DGN of topographical features
8. Des #_SRxx Topo.fwd – InRoads DTM containing the processed Survey
9. Des #_SRxxSeed.dgn – Sets the coordinate system for every InRoads based file in your project.
10. IN_GeoCS.dty - This file contains the customized coordinate system information and should not be needed as this is also provided as part of the Seed file.

To begin a project, it's recommended to copy the DTMs and ALG that Survey provides into your Design\InRoads folder in ProjectWise.  These are the base files you'll start your project from and should be available in a read-write location as you will be directly interacting with them.

With these files copied into your project, it's suggested to rename the ALG to Des #_SRxx Design Alignment.alg. This will alleviate confusion and specifically denote that this file is for the proposed alignments while maintaining the collected information from the Survey alignment.

### 5.2-1c    Base Drawing Creation

Unlike MX, no files other than a DGN are required to station an InRoads Project. Using the advanced document creation wizard, you can create your base drawings using the unit appropriate seed file as noted in Section 5.1-6. Like MX, the INDOT base drawing naming convention will still be used.

Project information will be organized into several base drawings. The information is separated based on categories of information included. These base drawings are the locations for all line work. Most base drawings will be created while in InRoads in MicroStation. By using MicroStation referencing tools, a base drawing can be enhanced to view other base drawing information as a backdrop. Please refer to *Appendix B - Naming Conventions* for a summary of base drawings. Below is a list of Standard Base Drawings to be used at INDOT and descriptions of their contents. Other names are possible based on project needs.

| Standard Base Drawings (InRoads created) | | |
|---|---|---|
| Drawing Names / Logical Names | Descriptions / Reference Descriptions | Examples |
| Survey Alignment | Survey Centerline | Survey Alignment.dgn |
| Survey Section Corner | US Government Section Corners | Survey Section Corner.dgn |
| Survey Contours | Survey Existing Contours | Survey Contours.dgn |
| Survey Topography | Survey Existing Topography | Survey Topography.dgn |
| Survey Triangulation | Existing Triangulation | Survey Triangulation.dgn |
| Explan scale | Design Existing Topography | Explan 20.dgn<br>Explan 50.dgn<br>Explan 100.dgn |
| Excont scale | Survey Existing Contours | Excont 20.dgn<br>Excont 50.dgn<br>Excont 100.dgn |
| Prplan scale | Proposed Design Strings | Prplan 20.dgn<br>Prplan 50.dgn<br>Prplan 100.dgn |
| Prcont scale | Proposed Contours | Prcont 20.dgn<br>Prcont 50.dgn<br>Prcont 100.dgn |
| RW Existing scale | Existing Right of Way | RW Existing 20.dgn<br>RW Existing 50.dgn<br>RW Existing 100.dgn |

If your project is anticipated to require multiple scales, it is desirable to create multiple base drawings at those scales. Creating the multiple scaled drawings is easily done by creating a new

plan display titled appropriately for the scale to be created, and then displaying the appropriate models at the desired scale.  Some examples of scales and various usages are presented below.

Using this procedure makes it extremely easy to vary the scale of a sheet by simply picking the base drawings that have the desired scaling when referencing into the MicroStation drawings.  From this point forward, only a 1" = 50' scale will be used in this documentation, the scale will vary with projects, and other scales can be developed using the same procedures are described.

*US*

| Scale | Typical Uses |
|---|---|
| 1" =  20' | Construction details and other detail drawings. |
| 1" =  30' | Bridge Layouts |
| 1" =  50' | Most common scale used in plan and profile sheets and plan drawings. |
| 1" = 100' | Pavement marking plans, and other miscellaneous sheets. |

*Metric*

| Scale | Typical Uses |
|---|---|
| 1:200 | Construction details and other detail drawings. |
| 1:500 | Most common scale used in plan and profile sheets and plan drawings. |
| 1:1000 | Pavement marking plans, and other miscellaneous sheets. |

## 5.3     Starting InRoads

At this point, you should now have your ProjectWise project, and a base sheet created.  If using the seed files as defined with InRoads as the application association, you may Check Out/Open the file directly from ProjectWise, which will start both MicroStation and InRoads Suite.

If you changed the application association for the DGN seed file to MicroStation, you will need to Check Out/Open the file which will only start MicroStation.  Once in MicroStation, you will then need to start InRoads Suite.  To do this, go to the MicroStation Applications menu (due to an inconsistency with AutoTrack and SignCAD, multiple Application menus may appear) and select InRoads Group -> Activate InRoads Suite as shown in the following illustration:
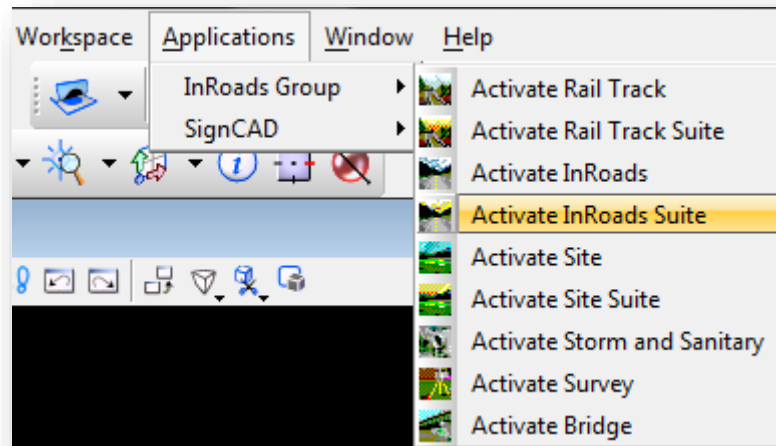
Starting InRoads in MicroStation

## 5.4 Opening, Closing and Saving InRoads Files from ProjectWise

With the integration of InRoads and ProjectWise, procedures for Opening, Closing, and Saving files in InRoads differs from these functions as shown in training. As with MicroStation and other integrated applications, standard Open and Save dialogs are replaced with ProjectWise integrated dialogs with extended functionality.

### 5.4-1 Opening Existing Files

Opening files from within InRoads uses the standard ProjectWise Open dialog as shown:
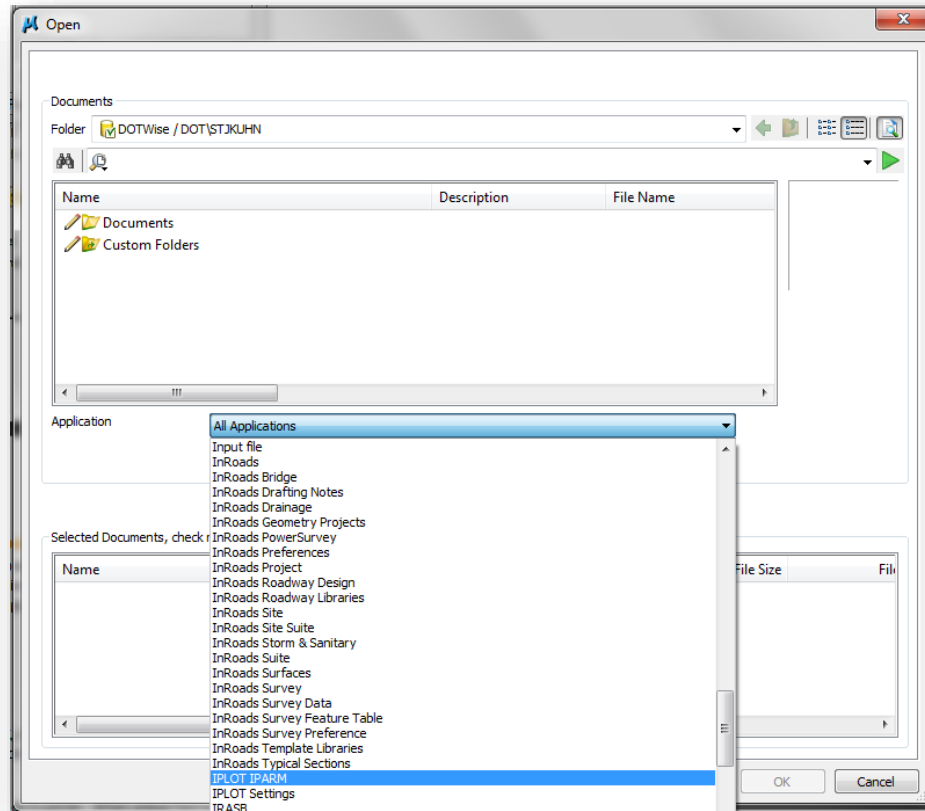
InRoads File types in ProjectWise

To ease finding appropriate file types, the preceding illustration shows the available file types that have been defined in the ProjectWise environment.  The following applications correspond to these common InRoads files types:

- InRoads Drafting Notes - .dft
- InRoads Drainage - .sdb
- InRoads Geometry Project - .alg
- InRoads Preference - .xin
- InRoads Project - .rwk
- InRoads Roadway Design - .ird
- InRoads Survey Data - .fwd
- InRoads Template Libraries - .itl

Additionally, you may selectively open files in a read only mode by adding them to the lower portion of the open dialog and enabling the check box for open read only:

**Adding Files to an Open list/Read Only**

### 5.4-2   Saving New Files

When performing a Save for the first time, or a Save As on an existing file, you will be presented with an InRoads/ProjectWise specific Save As dialog, as shown below:
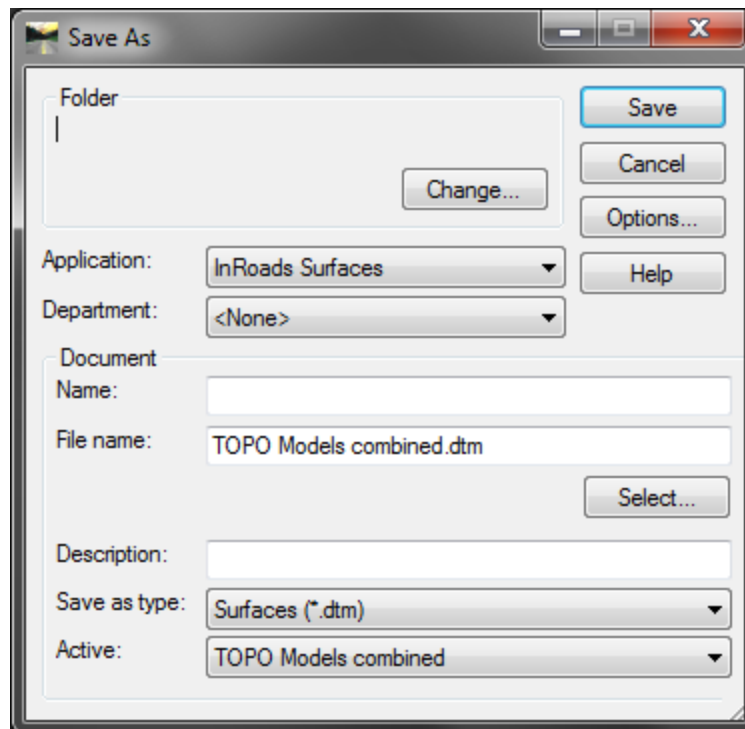


**InRoads/ProjectWise Save As Dialog**

All ProjectWise Save dialogs require you to define your project folder, document name, file name, and description.  It's still recommended that you maintain the same naming at least for the document and file names.  Also, it's very important to make sure the application is appropriately set to the InRoads file type you're attempting to save, as the dialog does not assume the file type you're saving.

### 5.4-3   Closing Files

When closing files from within InRoads, the behavior is slightly different from other integrated applications.  Due to how ProjectWise functions and InRoads works within MicroStation, there is no automatic prompt for check in, or automatic updating to the ProjectWise datasource.  It's recommended that when you've saved your files and have closed InRoads, that you use the

ProjectWise Local Document Organizer to check the remainder of your files in. You will be prompted to check-in your DGN per the standard functionality, but it's probable that you have any number of additional InRoads files open that also need checked in.

You can do this by opening the Local Document Organizer from ProjectWise:
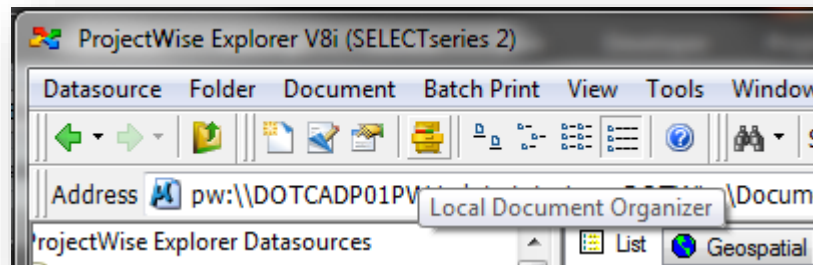


**Local Document Organizer Button**

With the Local Document Organizer open, you can then browse to the check out option, and then select all of the files you need to check in. Once selected you can right click on the highlighted files and perform a check in as shown:
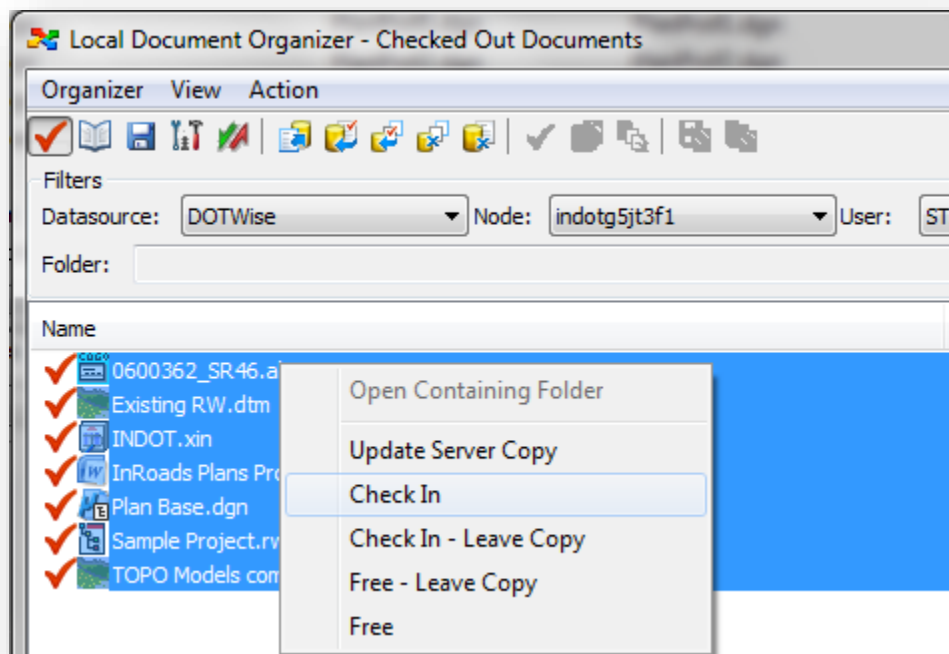


**Local Document Organizer Mass Check-In**

It's recommended that each check in be accompanied by good comments to allow quick review of anything that may have been done.

### 5.4-4    InRoads/ProjectWise Organizer

Within the InRoads environment, there is an additional shortcut to the ProjectWise Local Document Organizer and it can be found under the InRoads Explorer -> File -> Document Organizer menu item:
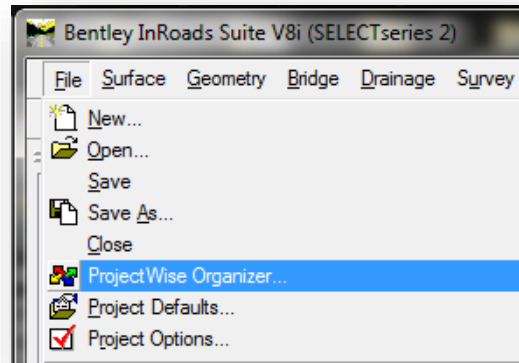


**Local Document Organizer in InRoads**

This is a self contained version of the Local Document Organizer and it acquires application focus from InRoads/MicroStation, preventing you from working within the application.

While you're working on the existing files and making/saving changes, you will want to use this tool to update your server copies frequently as not to lose any data.

## 5.5       Setting Up InRoads

Once you have started InRoads in your base drawing, you will need to setup InRoads to point to the INDOT XIN file, cell library and enable application add-ins used with our configuration.

### 5.5-1    Attaching the XIN

To attach the XIN, select File -> Open from the InRoads Explorer.  When presented with the ProjectWise open dialog, browse to Documents\INDOT Workspace\InRoads\XIN and select the INDOT.xin file.  This file will be read only at this location.  If you would prefer an editable copy to store your own preferences in, you may want to copy this file to your project and open it from that location instead.  Once opened, your InRoads Explorer should look similar to the following:
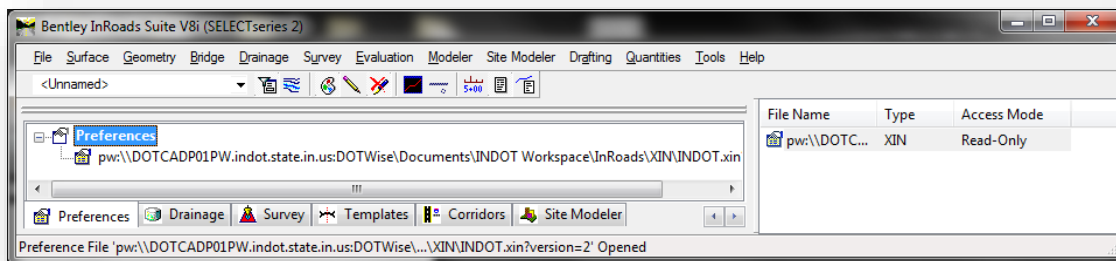


**INDOT.XIN Attached**

If you attached from a local project copy, the path will reflect the XIN location, and the Access Mode will display Read-Write indicating that you can write changes to the XIN file you've selected.

### 5.5-2   Attaching the Cell Library

With the XIN attached, you may need to attach the cell library prior to drawing any features.  If you receive the following error when attempting to draw features:
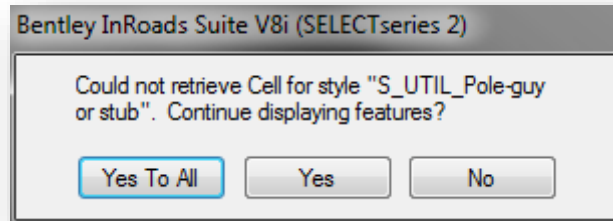


**Cell Library not Attached**

InRoads is indicating that it cannot find the appropriate cells for your features.

To attach the cell library, use the MicroStation Cell Library tool (MicroStation -> Element -> Cells menu option) and browse to Documents\INDOT Workspace\Managed\Workspace\Standards\cell\ and select IN_InRoads.cel.  At this time it is recommended that you save the settings for your file prior to continuing (MicroStation-> File -> Save Settings).

*Note:  ProjectWise automatically attaches this cell library on startup via the Managed Workspace. Instances of this error will only occur if you're working disconnected from ProjectWise.*

### 5.5-3   Project Defaults/.RWK Files

As the InRoads training courses demonstrate, Project Defaults and .RWK files both provide substantial benefit when opening, saving and closing your files.  The full functionality of these tools has been maintained in InRoads in ProjectWise, however there are some slight differences in what dialogs are displayed when working with these.  First, you will examine Project Defaults.

The Project Defaults (InRoads Explorer -> File -> Project Defaults) can be used to pre-open specific InRoads configuration files, while pre-defining paths to save to when creating new surfaces, alignments, corridors, etc.

The top half of the dialog, the Default Preferences section, allows you to pre-open InRoads configuration files such as the .XIN preferences, .DFT drafting notes, and various drainage configuration files.  The lower half allows you to define project specific paths for InRoads file types, so that when performing Opens/Save/Save As functions, your default path will take you directly to the folder location specified on your Project Defaults.  *Please note that when defining these paths that proper operation will require that the desired path be Browsed to and not placed with plain text. This will ensure that the appropriate folder is actually opened when using the Project Defaults.*

Additionally on this panel, you can define a default preference for all panels that you may interact with.  Due to the number of different preferences available in the INDOT.XIN, it's recommended that

you leave this setting at Default as shown.  In many cases, the default preference is configured to use a commonly scaled INDOT setup.

For more flexible Project Defaults, use of the $(_DGNDIR)\ (exactly as shown with the '\' character and parenthesis) variable can be sued from the ProjectWise Directory and Project Default Directory. Use of this variable in Project Defaults will have all InRoads dialogs default to the location of the currently open DGN for all file operations (Save, Save As, Open).
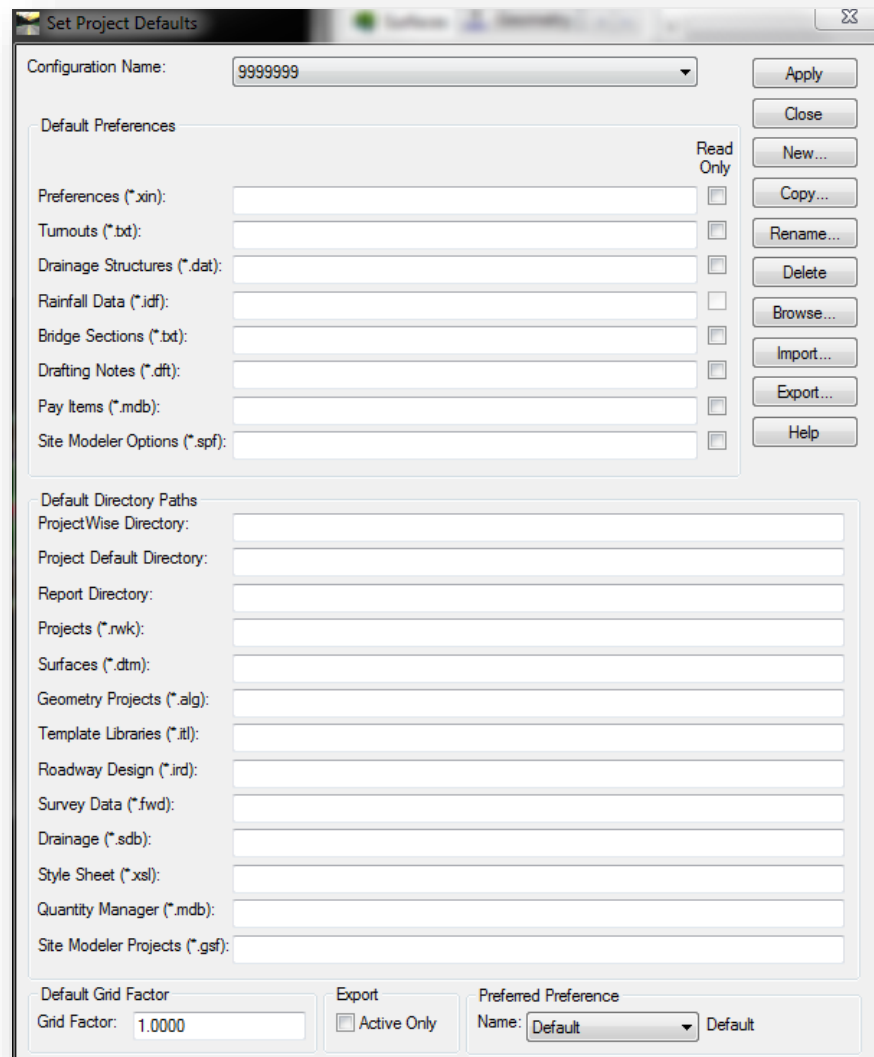


InRoads Project Defaults

For more granular control of the files you open and save, you will want to use the .RWK project files. The .RWK will allow you to define specific files that you'd like to open/update with the project file. The initial Save dialog is the same as the InRoads with ProjectWise save dialog shown in Section 5.4-2.  By selecting the Options button this panel, you will be presented the standard .RWK dialog for

adding/updating files. Further discussion of .RWK files can be found in the Bentley InRoads Road Fundamentals documentation.
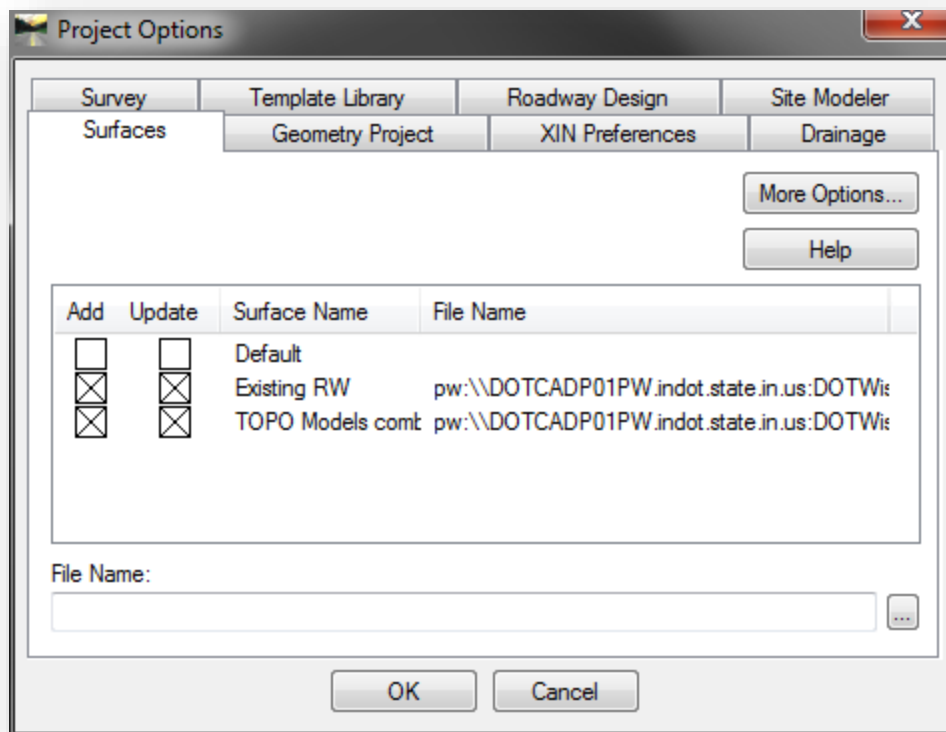


**RWK File Saving Options**

### 5.5-4 Enabling Application Add-Ins/Variable Manager

Not all tools within InRoads are immediately available in the base configuration. There are numerous application add-ins that are disabled but are extremely useful for day to day usage. These can be accessed via the InRoads Explorer -> Tools -> Application Add-Ins menu option.

The following menu is then presented:
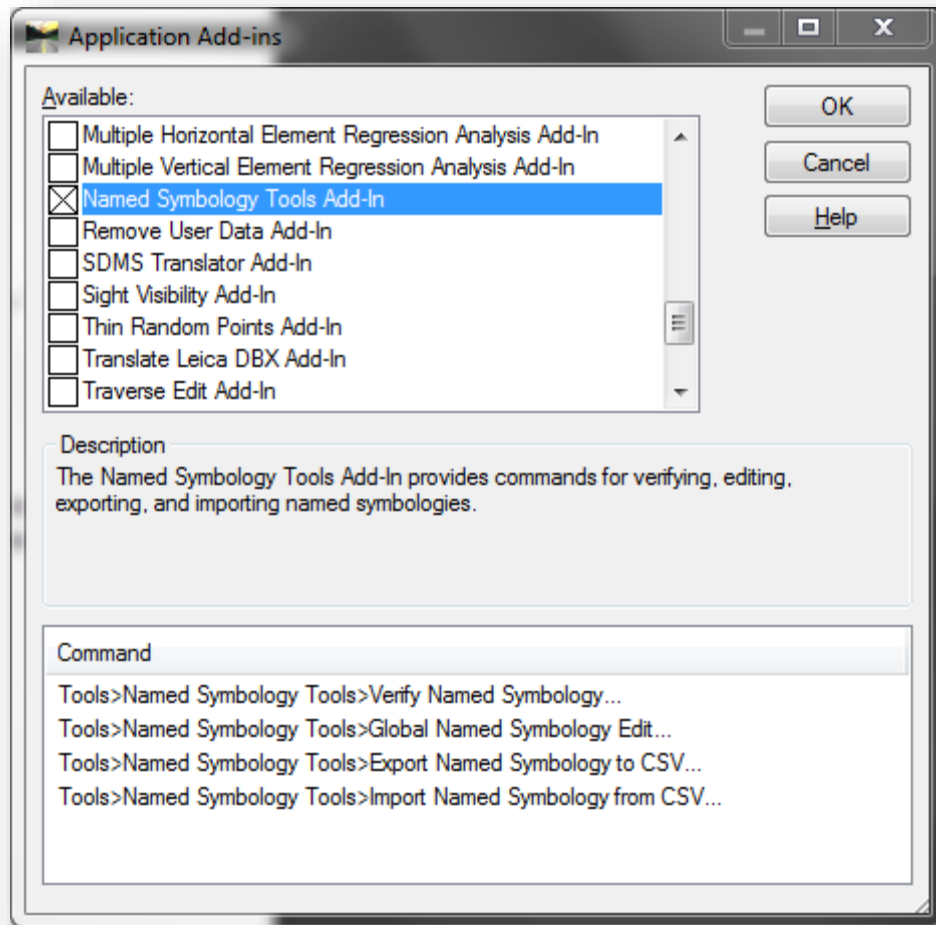
InRoads Application Add-ins

The upper portion of the application add-in dialog presents a list of available application add-ins. The lower portion of the dialog shows where the commands for the add-in can be found.  To enable an application add-in, select the check box to its left.

Of the available application add-ins, it will be necessary to enable the following:

- Global Scale Factors Add-In – Enables the global scale factor tool for resizing of InRoads symbols, linestyles and text

Additional useful add-ins may also be enabled such as:

- Active Project Settings Add-In – Used to select active surfaces, alignments, etc. without activating them from the InRoads Explorer
- Copy Preference Add-In – Enables the tools for copying preferences and styles from one XIN to another.
- Horizontal and Vertical Elements Add-In – Alignment creation tools similar to the element method alignment tools in MX.

### 5.5-5   Variable Manager

Variable Manager, enabled through the Application Add-Ins, includes a number of additional application customization.  Once enabled, to access Variable Manager, you to go to the InRoads Explorer -> Tools -> Variable Manager.  As these are more situation and usage specific tools, it is recommended you contact support before using them.

### 5.5-6   MicroStation and InRoads Status Bars

One convention that requires monitoring while using InRoads is the location of statuses that InRoads uses to prompt for input, or provide information.  As it has a high degree of integration with MicroStation, InRoads will use both its own status bar; and depending on the active function, it may use the MicroStation status bar.  Below is an example of each form of output and the location it can be found.
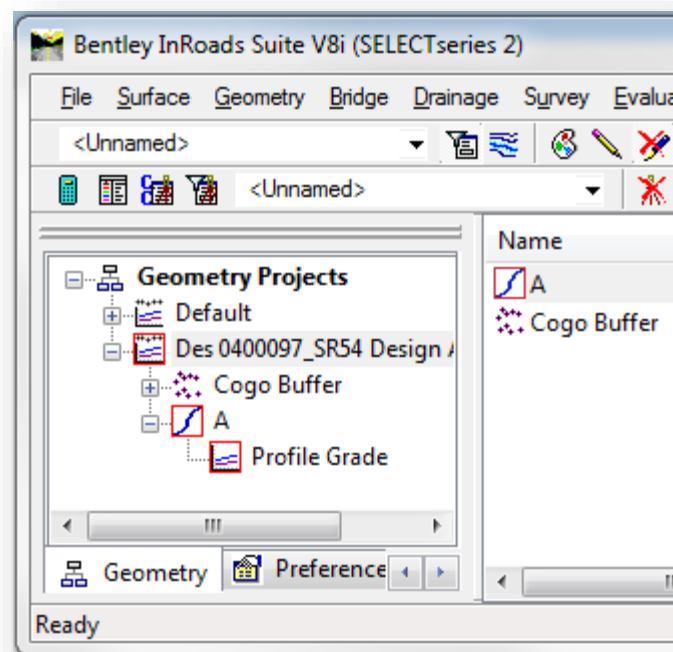


**InRoads Status Bar (Lower left corner of InRoads Explorer)**
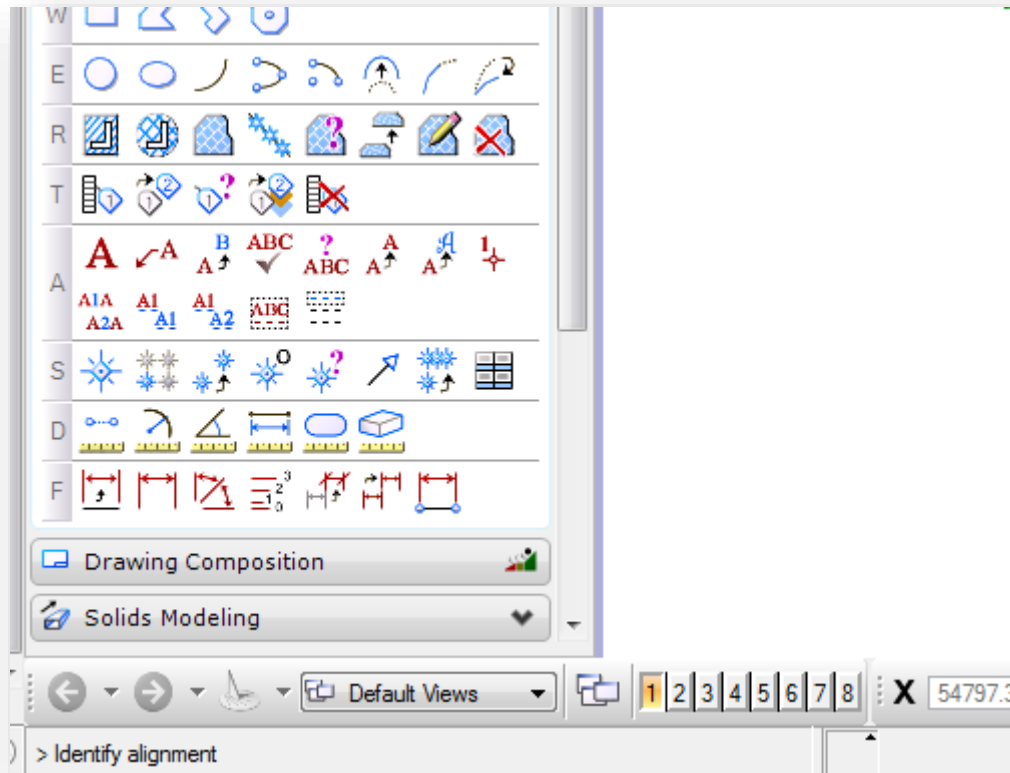
**MicroStation Status Bar (Lower left corner of MicroStation Application)**

## 5.6    Global Scale Factors

Due to differences on how InRoads interacts with linestyle scaling, it is no longer advantageous to use Annotation Scale for the display of features in InRoads. The functionality InRoads uses for scaling is an option referred to as Global Scale Factors. As noted in Section 5.5-4, you will need to enable this tool via the Application Add-Ins dialog. When enabled, you will be presented a new menu option under the InRoads Explorer -> Tools -> Global Scale Factors:
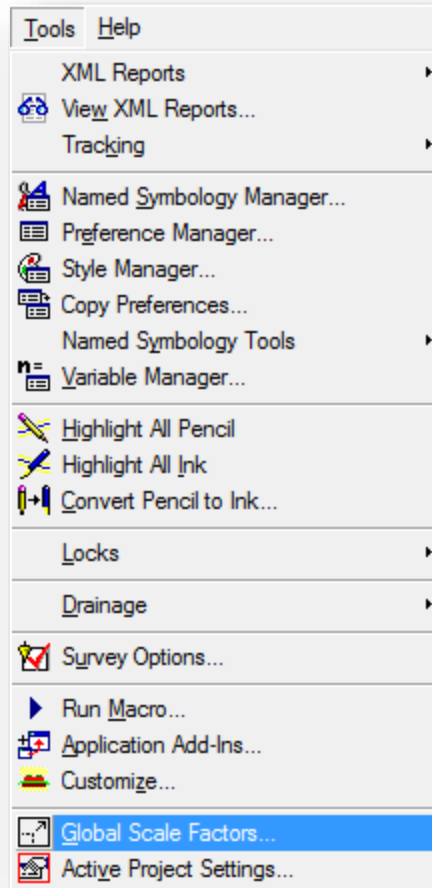
**Global Scale Factors**

The Global Scale Factors tool presents a small dialog box similar to the MicroStation Annotation Scale dialog:
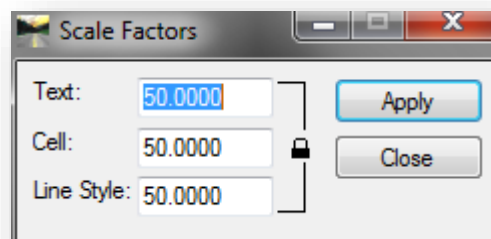


**Global Scale Factors**

This tool allows for the scaling of many InRoads elements including features, annotation text, and cell sizes. Throughout the Plans Production process, you will want to use these tools to create base and text drawings of specific scales.

Included below are samples of some of the most common standard base drawings:
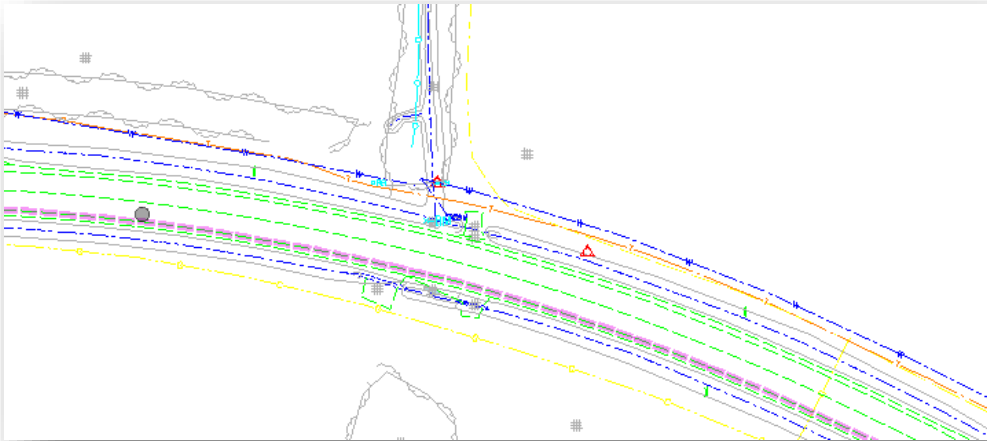


Explan 50
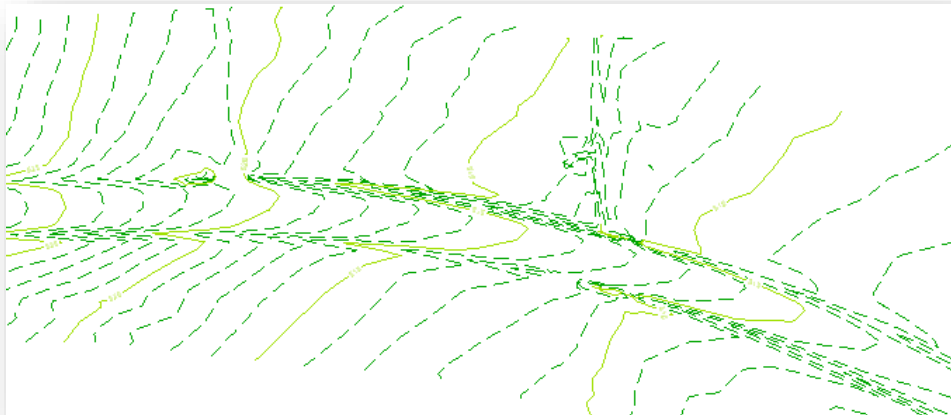


Excont 50
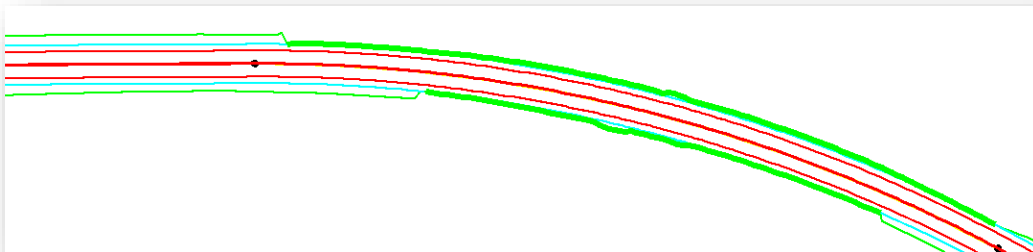


Prplan 50

# 6. Using InRoads for Survey/Routeplat Production

The following sections discuss the usage of InRoads for Routeplat development. These procedures should be used for the development of survey deliverables as noted in Chapter 26 of the INDOT design manual. These procedures are written as though the appropriate InRoads files already exist; such as the fieldbooks (.fwd files), survey alignment (.alg file), and the surfaces (.dtm files). More in-depth discussion of these procedures can be found in the InRoads Survey Fundamentals published on the Bentley Learning Network along with the InRoads Road Fundamentals.

In addition to the InRoads specific tools noted throughout this section, also keep in mind the Survey tools provided on the INDOT Tools task navigation pane in MicroStation. Details on these items can be found in section 3.1-6b Tools Included in the INDOT Tools Task Navigation.

## 6.1 InRoads Survey Options

When working with the InRoads Survey tools, knowledge of the InRoads Survey Options (*Tools -> Survey Options*) is beneficial. This section will touch on some of the more important options that you may have to interact with.
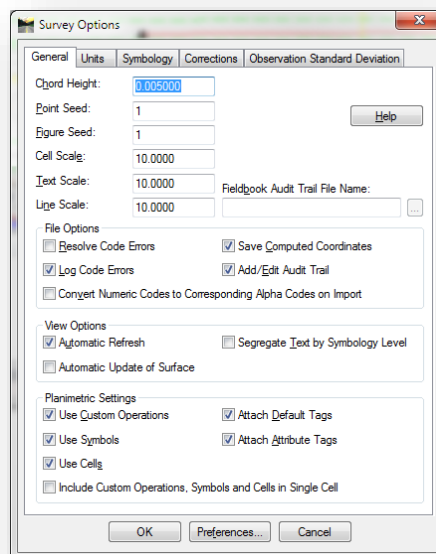


**General**

On the General Options tab, the three scaling options for cell, text and line may need adjusted depending on the desired scale of your graphics. Additionally, there are the options for Automatic Refresh which will affect when InRoads will update the planimetric graphics while working on the fieldbook. Depending on the type and volume of changes, disabling this setting may be advantageous, as the interactive graphics refresh can cause system slowdowns depending on the size of your survey.
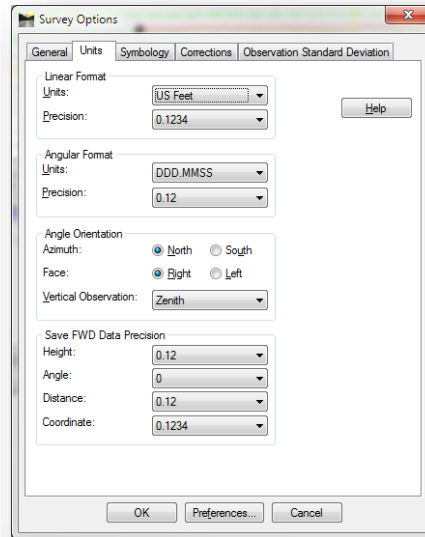
**Units**

On the units tab you have the option of changing the unit format, angular format and precision.
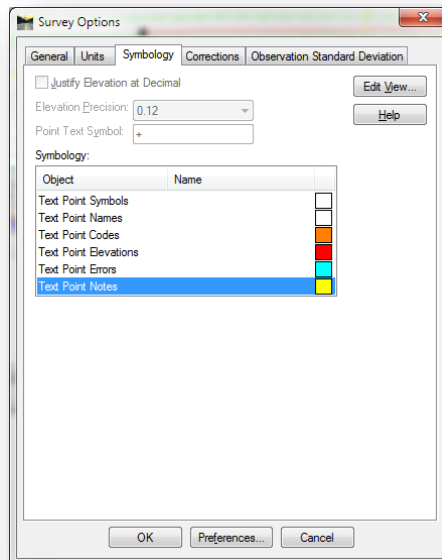


**Symbology**

The items on this tab can be used to override the default symbology of graphics created from planimetrics.
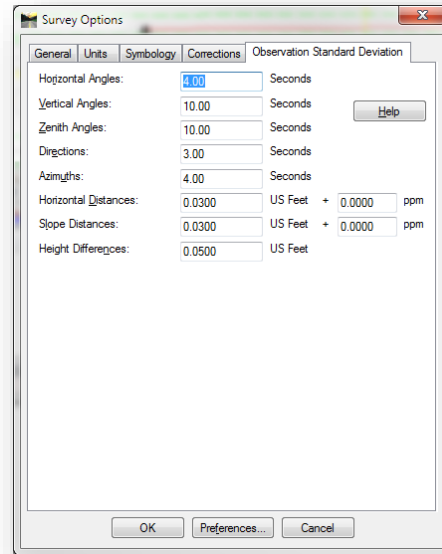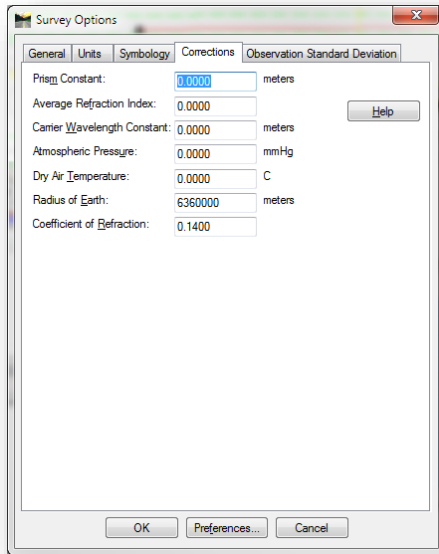
**Corrections and Observation Standard Deviations**

These tabs control how InRoads interprets input from data collector files.
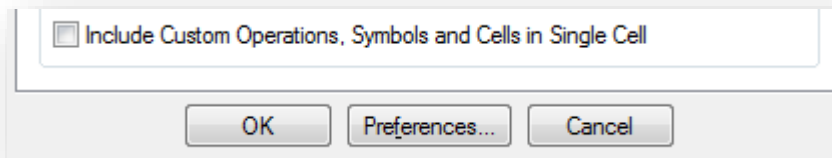


**The Preference Button**

On all tabs of the Survey Options there is a Preferences button. This button allows you to load pre-defined settings for the Survey options. Currently there are pre-defined options for both 10 and 50 scale setups. More information on preferences can be found in section 5.1-2 INDOT Specific Preferences.

## 6.2    Creating the Survey Topography/Working Drawing

For the following procedure, the initial steps should take place *PRIOR* to the creation of InRoads deliverables. It will be noted in the process where the InRoads files will be created and access. The survey topography drawing can initially be used as a working file for the creation of the InRoads deliverables until which time it can be used for its specific purpose.

### 6.2-1   Creating the Topo Drawing in ProjectWise

Prior to creating any files for your project, the corresponding Survey project should exist in the ProjectWise system. The procedure for project creation can be found in section 2.4-2, Using the DOTWise Project Creator. With the survey project created, navigate to your District/Des. No. folder/Survey subfolder. Next, navigate to the Project Files folder:
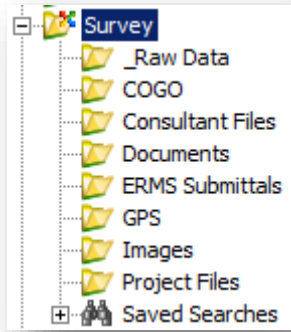
**Survey Project Folders**

With the Project Files folder selected in the ProjectWise Explorer, you can do one of two methods to create a new document:  Drag and Drop or use the New Document Wizard.  More specific information on document creation using the seed files can be found in section 2.8-1 Creating Documents from ProjectWise Seed Files.  For the purposes of this example, we'll look at creating a new document with the Advanced Wizard.

1. With the Project Files folder selected and its contents displayed in the Document pane, right click in the document pane and select *New -> Document*.
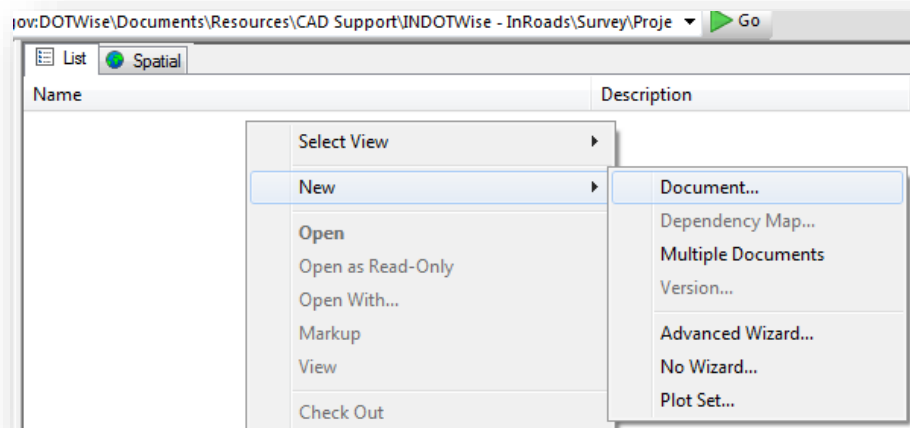


**Starting the New Document Wizard**

2. You'll then be presented with a series of options; we'll use the Advanced Wizard option.
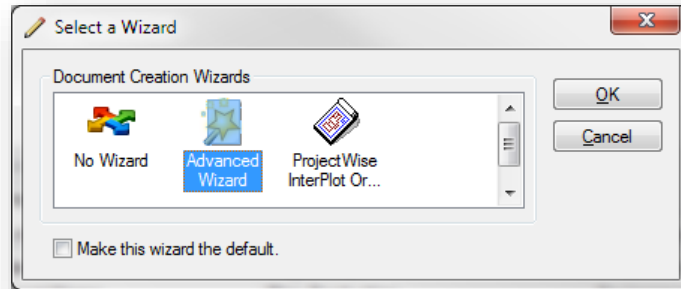
Using InRoads for Design/Plans Production

3. This will start the Advanced Documentation Creation Wizard.  The first panel is informational and can be bypassed.  The second panel confirms your location.  If for some reason you didn't have the correct folder active in your document panel, you can select it now or confirm the path shown.

4. The next panel allows us to select our template document we'd like to use.  On the first line "Use a ProjectWise document as a template" option and then press the select button.
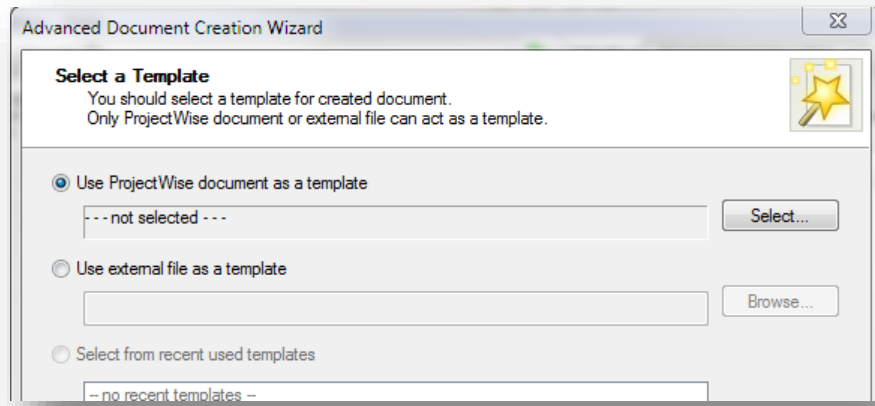


Select a Template dialog

5. In the "Select Template Document" panel, navigate to the InRoads Seed files in the ProjectWise System and select the appropriate unit files for your project.  These files can be found at:

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\InRoads\
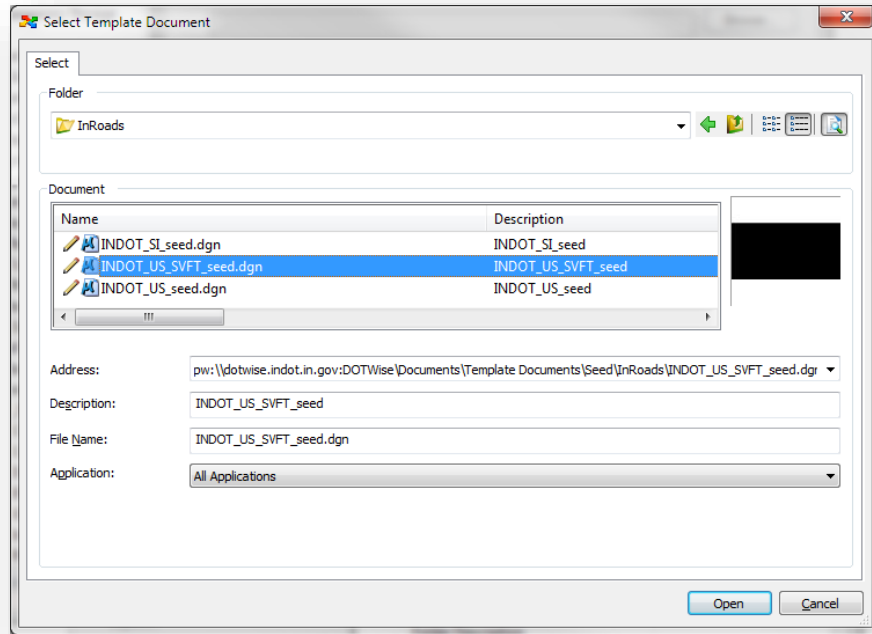
**Selecting a US Survey Foot InRoads Seed File**

6. With your file selected, you can then proceed to the next screen. If you are prompted for Document Attributes, you may proceed beyond this screen as well.

7. The final step in creating the document is to provide a name. Per the INDOT Design Manual, Survey Topo drawings should be titled with the following format: Des #_SRxx Topo.dgn. To ease document searches and for consistency purposes, all three names should be the same as shown.
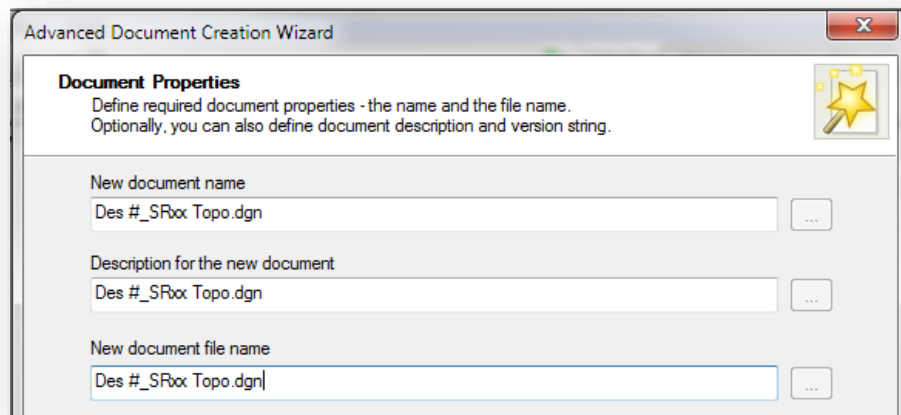


**Document Properties and Naming**

8. With the document named, you may now proceed through the remaining panels of the wizard and complete creating the document.

## 6.3       Creating InRoads Survey Deliverable Files

With your DGN file created, we'll briefly recap the steps necessary to create the required InRoads deliverables for a Survey project.  For each process, make sure MicroStation is started by opening your DGN from within ProjectWise, and activating InRoads as discussed in section 5.3 Starting InRoads.

Please note due to limitations in the ProjectWise configuration, InRoads must be started from within MicroStation.  Previous workflows that allotted for the drag and drop of files onto an InRoads icon or the direct startup of the application are unavailable.

### 6.3-1    Creating a Geocoordinated Seed File

The following procedure steps through the process for creating the Geocoordinated Seed file for use through the project lifecycle.  The creation of these files allow for any CAD files based on the created seed file to be instantly consumed by the ESRI ArcGIS Products and made available for a variety of other uses.

1. After creating your Survey folder in your DES No. specific project via the DOTWise project creator, navigate to the Project Files folder:
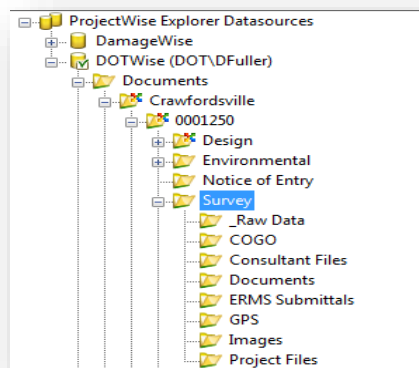


2. *In this folder you will find a list of seed files associated to the Coordinate System with the appropriate working units.  Select the one that pertains to your project.* ***Rename*** *the file in the following format ex:* ***0001250_IR1000_seed.dgn. (A file called IN_GeoCS.dty should be in the folder as well).*** *If there is not one there, you can also copy it from the Template Survey Seed Files folder location to the Project Survey folder.*



3. From your Project Files folder right click and Check Out your IN_GeoCS.dty file locally.
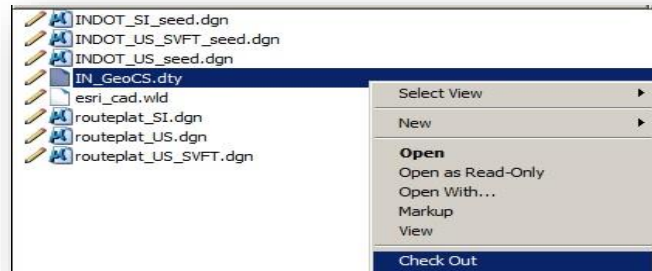
4. Navigate to your newly renamed seed file in the Des No. Project Survey folder double click on the file to open it in MicroStation. (Allow for Managed Workspace to download).
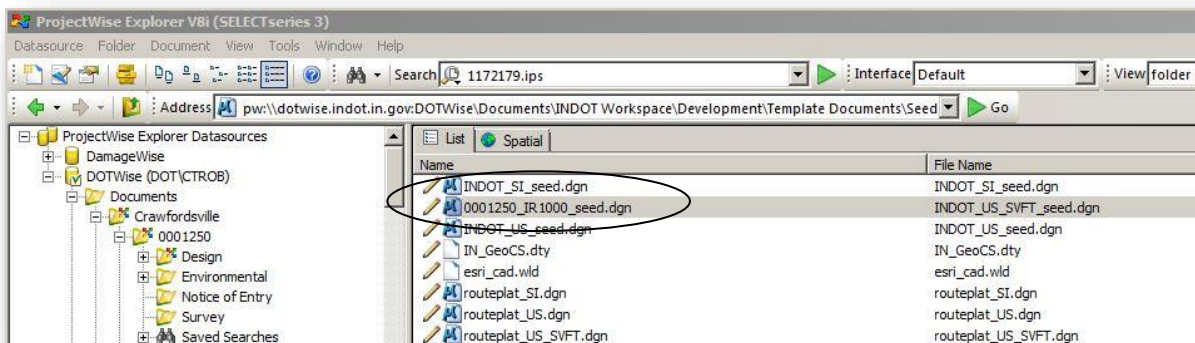


5. Start InRoads Applications->Activate InRoads Suite.
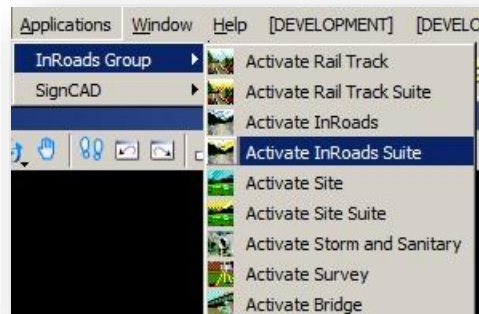


6. Once InRoads is active, start Bentley Map software by selecting Applications->Map->Activate Map from the Applications pull-down beneath the InRoads Group.

7. Open the Geographic tool in MicroStation by selecting Tools->Geographic->Open as Toolbox.
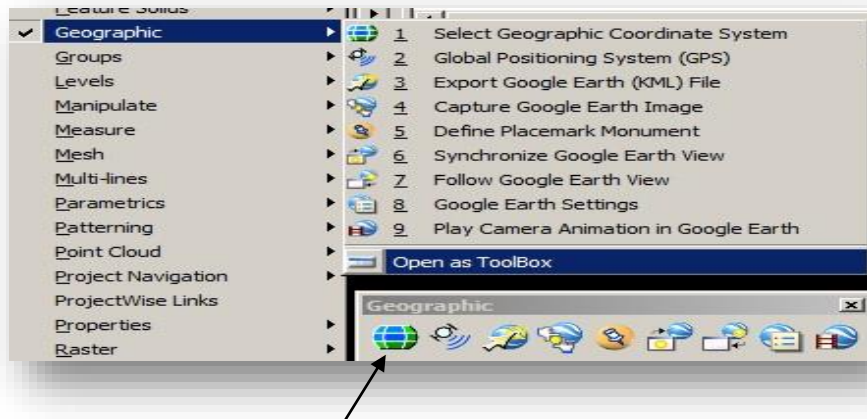


8. Click on the Select Geographic Coordinate System tab within the Geographic toolbox.

9. In the Geographic Coordinate System (GCS) toolbox select the From Library tab.
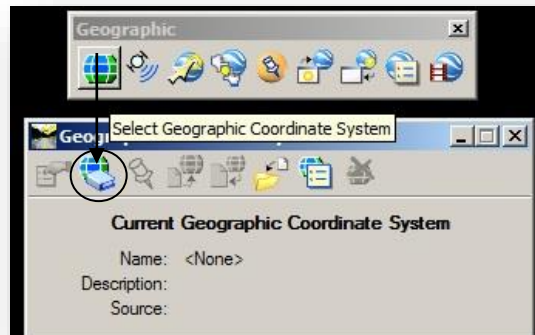


*The Library tab contains folders with all the available coordinate systems.  The Favorites, IN_GeoCS and Library are the folders you will see.  In the IN_GeoCS folder there will be a list of coordinate Systems for Indiana State Plane East and West and the Local Ground Coordinate System (LGCS) templates.*
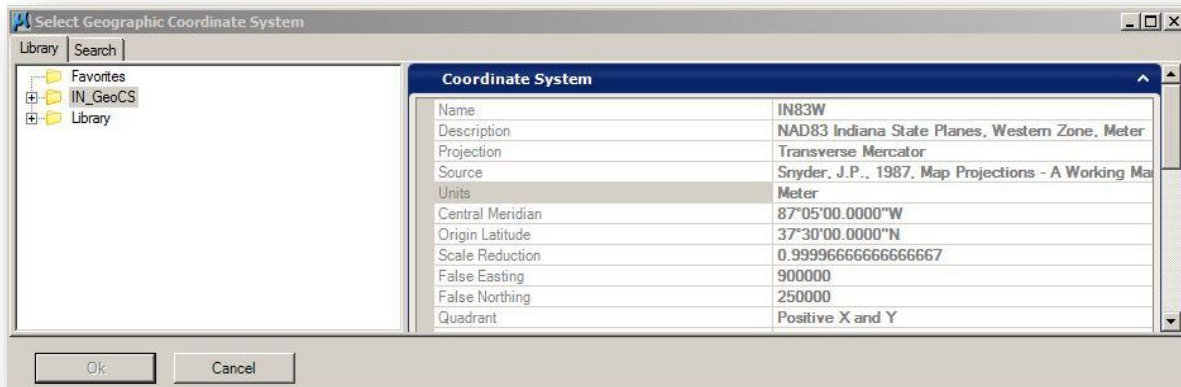
10. At this point you will need to select and modify the Local Ground Coordinate System definition titled "Copy-LGCS Template – LGCS" by right clicking on it in the IN_GeoCS list and choosing Edit Coordinate System Properties.
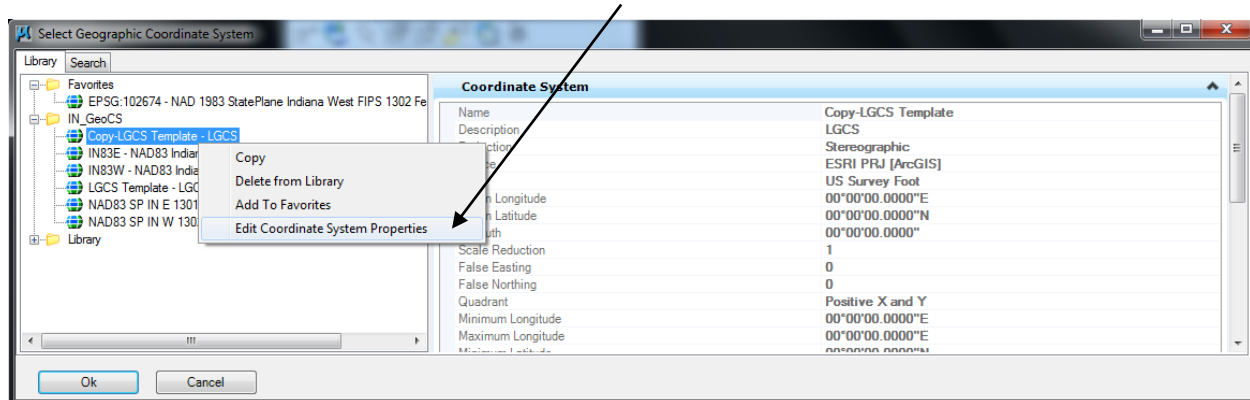


11. You will need to modify the Name, Description, Origin of Latitude, Origin of Longitude, Azimuth, Scale Reduction, False Easting and False Northing to the appropriate values from metadata for the User Defined Local/Ground Coordinate System of the project.

*These values can be obtained from the Local Ground Coordinate System (LGCS) metadata you created for the survey. The name and description should be related to the INDOT project, DES number and road designation (ex. 0001250_IR1000). The Azimuth is the Convergence Angle at the origin point for the Local Ground Coordinate System. The convergence angle can be obtained by using Corpscon (U.S. Army Corps of Engineers) or from Trimble Business Center (TBC). If the convergence angle is a negative value it will need to be input in decimal degree format. An example of the Corpscon output with the convergence angle is below. Depending on the units of the survey you may need to change from US Survey Feet to International Feet of Meters. The scale reduction is the combined scale factor (CSF) from the TBC for the LGCS you created for the Survey.*

**Office**
**Project**
28 February 2013

| INPUT | OUTPUT |
|---|---|
| State Plane, inhpgn - Indiana HPGN 1302 - Indiana West, U.S. Feet | Geographic, inhpgn - Indiana HPGN |

**PSSA 301**                              1/1

Northing/Y: 1529272.1771          Latitude: 39 26 46.57515
Easting/X: 2834574.7158          Longitude: 87 30 06.46291

Convergence: -0 15 57.14803
Scale Factor: 0.999982635

Remark:
Corpscon v6.0.1, U.S. Army Corps of Engineers

*Here is an example of the Coordinate System definition once the Parameters have all been input.*

Edit Geographic Coordinate System

**Coordinate System**

| Name | 0001250_IR1000 |
|---|---|
| Description | LGCS |
| Projection | Stereographic |
| Source | ESRI PRJ [ArcGIS] |
| Units | US Survey Foot |
| Origin Longitude | 87°30'06.4629"W |
| Origin Latitude | 39°26'46.5751"N |
| Azimuth | -00°15'57.1480" |
| Scale Reduction | 1.0000354312 |
| False Easting | 40000 |
| False Northing | 40000 |
| Quadrant | Positive X and Y |
| Minimum Longitude | 00°00'00.0000"E |
| Maximum Longitude | 00°00'00.0000"E |
| Minimum Latitude | 00°00'00.0000"N |
| Maximum Latitude | 00°00'00.0000"N |

**Datum**

| Name | NAD83 |
|---|---|
| Description | North American Datum of 1983 |
| Source | US Defense Mapping Agency. TR |

**Ellipsoid**

| Name | GRS1980 |
|---|---|
| Description | Geodetic Reference System of 19 |
| Equatorial Radius | 6378137 |
| Polar Radius | 6356752.3141403478 |
| Eccentricity | 0.081819191042830641 |

Ok          Cancel

12. Once you have updated the necessary information, select OK and the new coordinate system will be stored. It will now be listed along with the originals as shown. (It will retain this information in the IN_GeoCS.dty file).
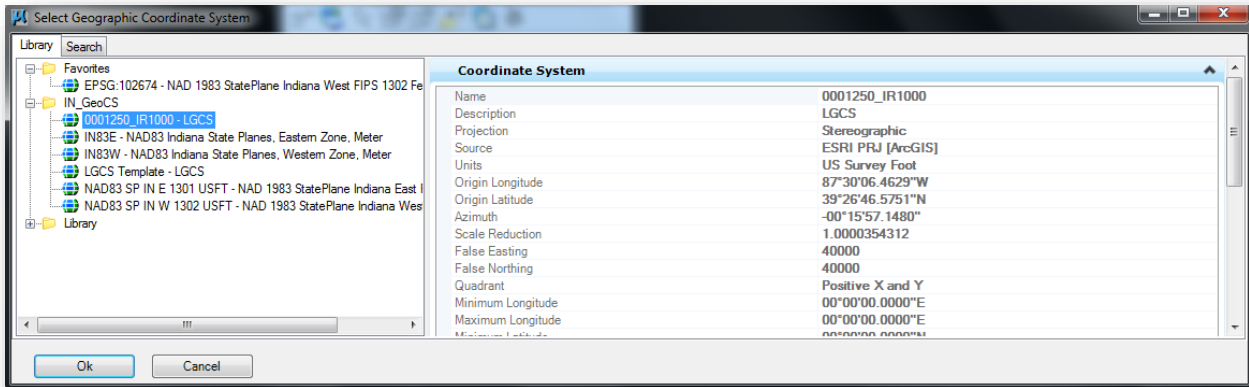
13. Now that the new Coordinate System has been created, you can select it and assign it to the drawing by double left clicking on it in the list.
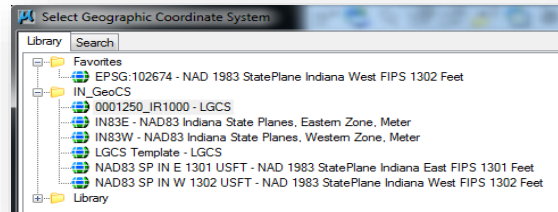


14. A pop-up dialog will appear asking you to choose:  Be sure to select the option to keep the storage units as they are (shall not be changed).
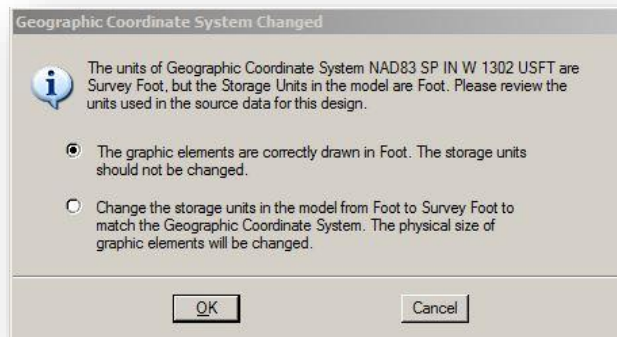


15. The newly selected Coordinate System will now appear in the Geographic Coordinate System dialog window as shown:
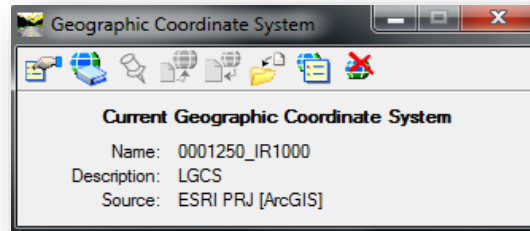
16. Upon completion of these steps you will need to exit MicroStation and Check-in your CAD file. This will only check in the active .dgn file and not the .dty file. Please add comments upon check-in.
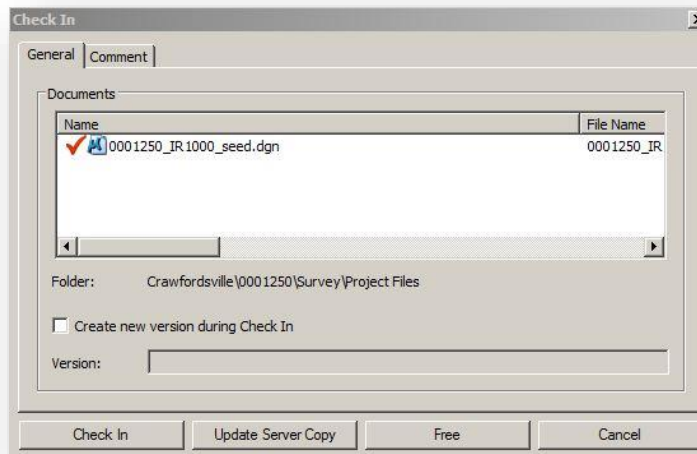


17. Go to the active Project Files folder in the appropriate project location in ProjectWise and check-in the IN_GeoCS.dty file.
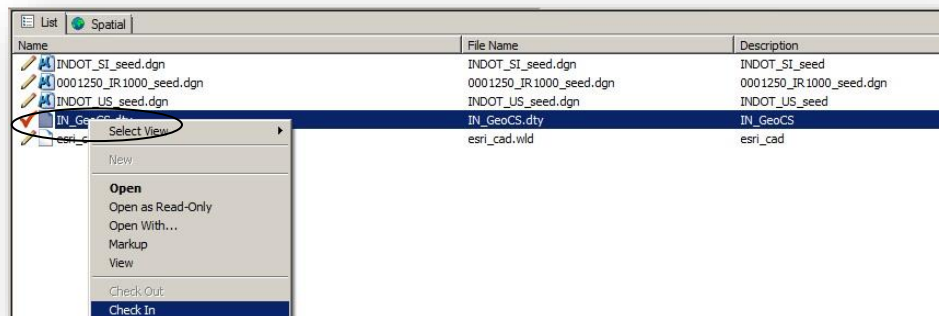


18. Right click on the file in the list and select Check-In.

*This will place the checked out copy back into your Project Survey location with the updated information and the time file was last updated. (Be sure to add comments as to what changes you made to this file). Any time you wish to edit the data in the IN_GeoCS.dty file related to the active project, it must be checked out first and then checked back in to ensure it remains current to that project.*
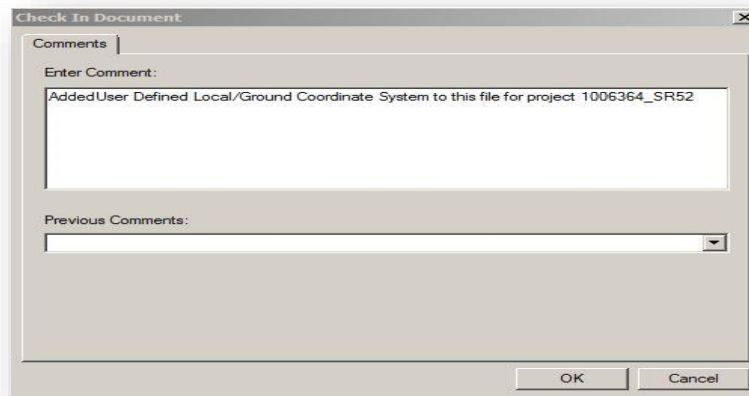


With the LGCS defined within the dgn file the survey can be processed through InRoads in the typical manner. The only difference is that MicroStation knows the parameters to convert data in any other standard coordinate system to the LGCS. This means that ortho-imagery, GIS files, etc. can be referenced to the dgn file and MicroStation will re-project them to the LGCS on-the-fly so that the data is all spatially referenced.

### 6.3-2   Creating a World File

In the same ProjectWise folder as the MicroStation dgn and In_GeoCS.dty files for your survey are stored *you will need to create a .wld file.* The .wld file contains the necessary parameters to transform the dgn files to the State Plane Coordinate system. This allows the data in the files to be re-projected on-the-fly to its appropriate location on the ground in the real world.

The .wld file is ASCII format and can be created in Notepad or any other editor. The name of the file needs to be esri_cad.wld. By using this naming convention only one .wld file is necessary and the ESRIGIS Products will automatically associate the esri_cad.wld file to all the dgn files in that directory folder.

The data in the .wld file will consist of the Local Ground Coordinate System for two well established control points and the corresponding State Plane Coordinates for the same two points.

The format of the coordinates in the esri_cad.wld will be the following:

Line 1: [LGCS Easting (CP 1)] [LGCS Northing (CP 1)] [SPCS Easting (CP 1)] [SPCS Northing (CP 1)]
Line 2: [LGCS Easting (CP 2)] [LGCS Northing (CP 2)] [SPCS Easting (CP 2)] [SPCS Northing (CP 2)]

Note:   LGCS = Local Ground Coordinate System
        SPCS = State Plane Coordinate System

CP = Control Point
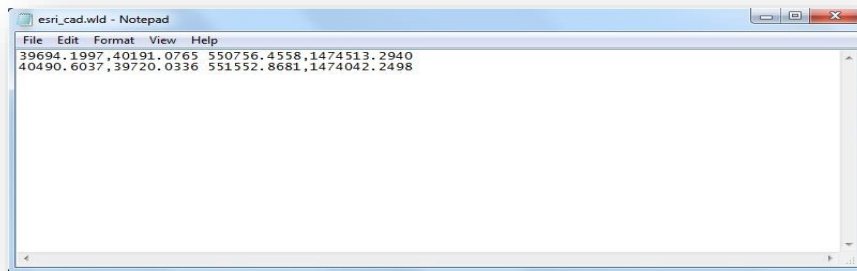


Here is an example esri_cad.wld file:

### 6.3-3   Creating the Survey Fieldbook. (.fwd files)

1.  At this time, MicroStation and InRoads should be running.  On the InRoads Explorer, open the survey tab.
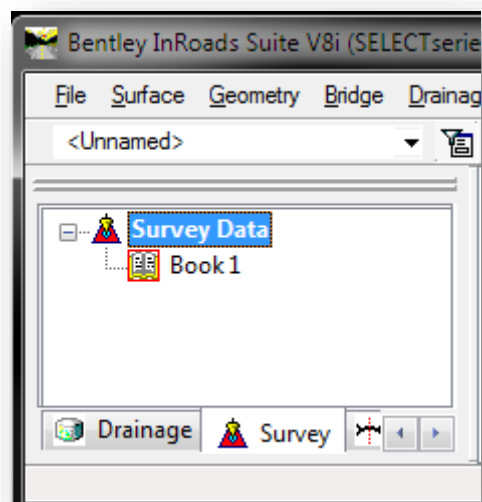


The Survey Tab

2.  With the tab active, create a new Survey Fieldbook by right clicking on the Survey Data icon and selecting New.  When prompted, enter the name of your fieldbook in the appropriate Des #_SRxx Topo naming format.
3.  Make your new fieldbook active if for some reason it's not, then right click on the fieldbook and select import and find the location of your data collector file.  These files should be uploaded to the ProjectWise system, and navigated to via the ProjectWise Open dialog.  If they've not yet been uploaded, cancel this panel and locate the file on your local PC.
4.  With the file located you'll be presented with the Import Survey Data Options panel.  Please note that the appearance of this panel will differ depending on the source of the data.  In both instances, the panel provides the same options and functionality.
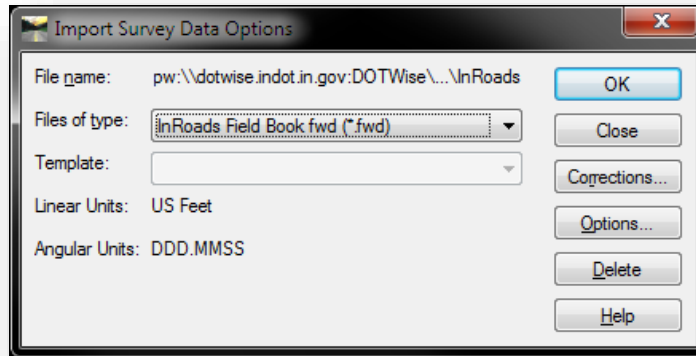
**Import Survey Data Options**

5. Complete the Import Survey Data wizard and dismiss any remaining Import/Open dialogs. At this time, you need to save your fieldbook back into ProjectWise. To do so, right click on your fieldbook and select Save As. You'll be prompted with the ProjectWise integrated InRoads Save As dialog.

6. First on the Save As dialog, set your ProjectWise path. These can be preconfigured based on values provided in the InRoads Project Defaults (more information can be found in section 5.5-3 Project Defaults/.RWK Files). Then set your appropriate file names/descriptions. As with the .dgn file we created earlier, all three of these should be set the same.
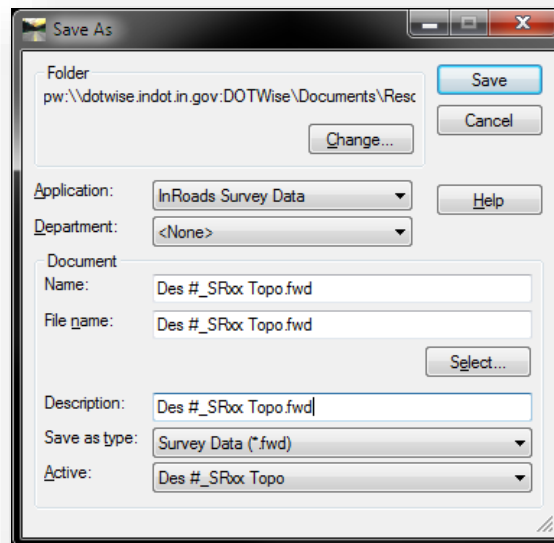


**Save As Dialog**

7. With the fieldbook now created and ProjectWise record saved, you will need to manage additional save operations and updates via the InRoads Document Organizer as shown in section 5.4-4 InRoads/ProjectWise Organizer.

### 6.3-4 Creating the Surfaces (.dtm files)

With our Survey Fieldbook now created, we need to create the surface .dtm files for both the Topo and the Survey boundary. First we'll create the Topo .dtm.

1. With your Survey Fieldbook open and active in the InRoads Explorer, navigate to *Survey -> Survey Data to Surface*.
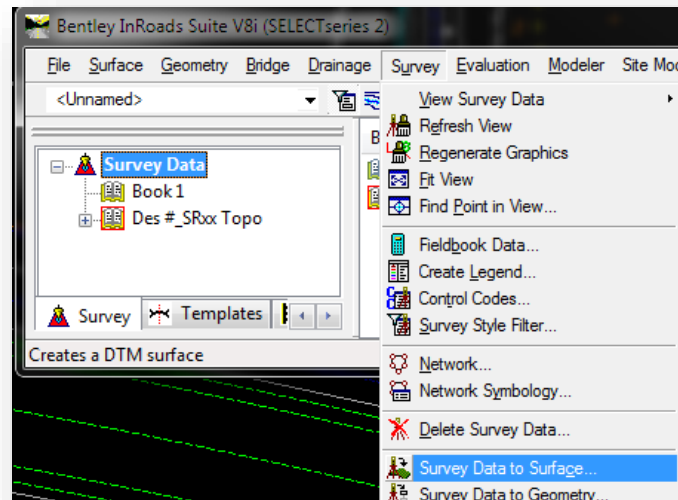
Survey Data to Surface

2. On the Survey Data to Surface panel, define the settings as shown. Make sure the Surface name is appropriately defined, and that the Description uses the Style Description and that the Surface always uses Alpha Codes.
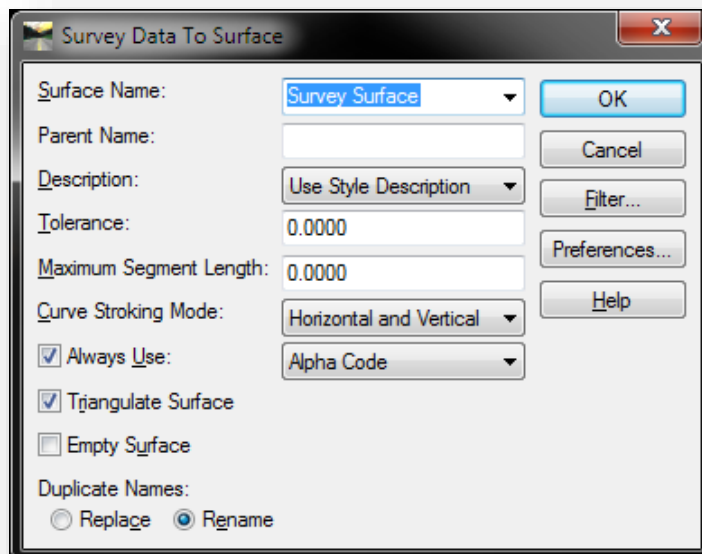
Survey Data to Surface Settings

3. At this point you'll have a new surface show up on the Surfaces tab.  Save this document using the same method we did for the .fwd file in the previous example.

### 6.3-5  Triangulating the TOPO and Feature Inclusion

1. With our DTMs created, reactivate the Survey Surface containing your TOPO features.
2. On the InRoads Explorer, navigate to *Surface -> Triangulate Surface* on the InRoads Explorer.  Note you can also force a triangulation by going direction to the Surface -> View Surface -> View Triangles menu.  You will be prompted prior to running this command if an existing triangulation doesn't exist.
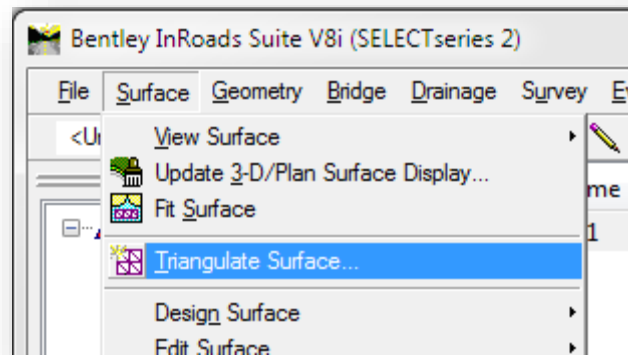


Triangulate Surface

3. On the Triangulate Surface menu, in most cases you can use the defaults.  If you find yourself with a large number of triangles that are too long, it may be beneficial to limit the triangle length in the Maximum Length field.
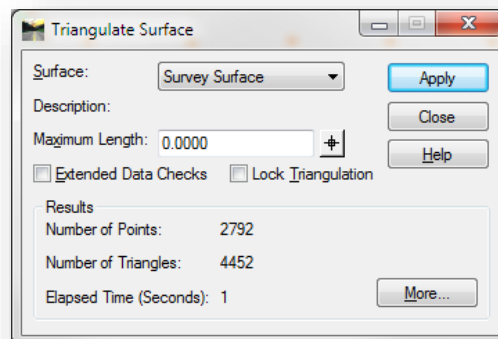


Triangulate Surface

4. When satisfied with your settings, select the Apply button.  InRoads will then process the triangulation based on the settings you've provided.
5. At this time you will want to view the triangulation by using the Surface -> View Surface -> View Triangles command.  Depending on the needs of your data, you may need to use the surface features taught in the Bentley InRoads Survey and Surface Modeling courses that

were previously taught to clean up the triangulation such as Deleting Triangles.  This should be performed prior to creating a surface boundary or drawing up contours.

6.  To reduce initial clutter in our .dgn, at this time we need to shut the level for the triangulation off.  Start the Level Display tool from the MicroStation toolbar.



Level Display

7.  You can sort through the list and find the G_SURF_ExTriangles and shut the level off that way.  The fastest method is to shut the level off by using the Level Display selection tool.  With the Level Display open, right click anywhere in the list of levels.  You'll be presented with a dropdown of various level commands, where you'll want to select Off ByElement.
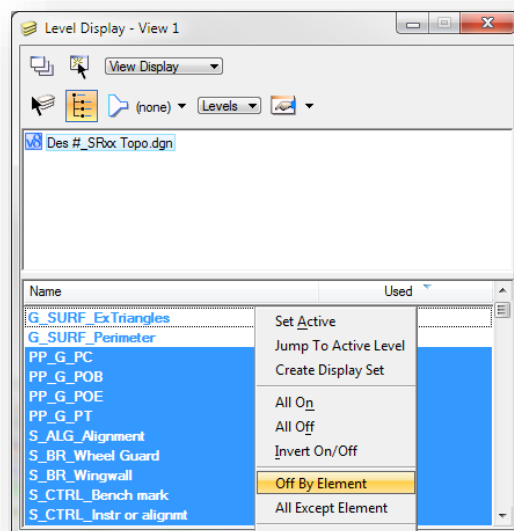


Level Display Off By Element

After selecting the Off ByElement command, you can simply left click on the element that you'd like to shut off, in this case, any part of the triangulation.  With your level off, make sure to save your settings (*File -> Save Settings* on the MicroStation menu)

8.  Should you need to adjust the features that are included in the Triangulation, you may need to adjust whether they are included or excluded, or the type of feature that InRoads processes them as.  To further examine the features, navigate to the *Surface -> Features -> Feature Properties* menu on the InRoads Explorer.
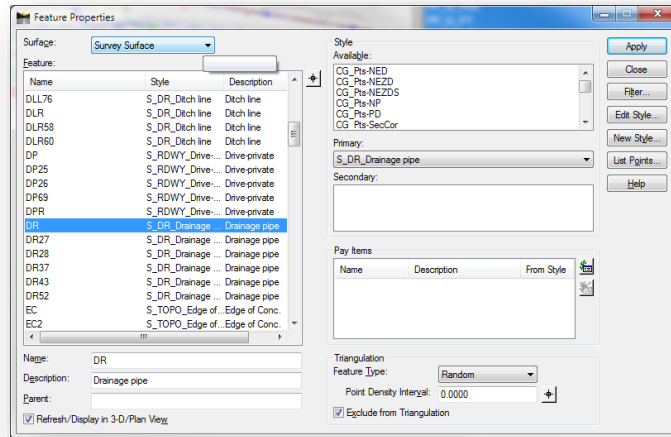
Feature Properties

9. On the left hand side, you have the listing of all features available in your .dtm file. When highlighting one, on the right you'll see the style it's defined as with a dropdown where you can change the feature to a different style. Of particular note for this discussion is the Triangulation section on the lower right of the dialog:
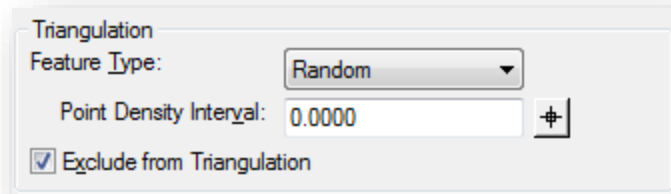


Feature Properties – Triangulation

10. In this section you can adjust whether or not a feature is included in the triangulation and the type of feature that it is (such as randoms, breaklines, exteriors and interiors). After selecting any changes that you make, select the apply button to confirm then repeat steps 2 thru 7.

### 6.3-6   Displaying Contours

With our triangulation now adjusted and generated, we will now display the contours and shut them off so they are available for referencing by other files.

1. Navigate to the Surface -> View Surface -> Contours menu on the InRoads Explorer.
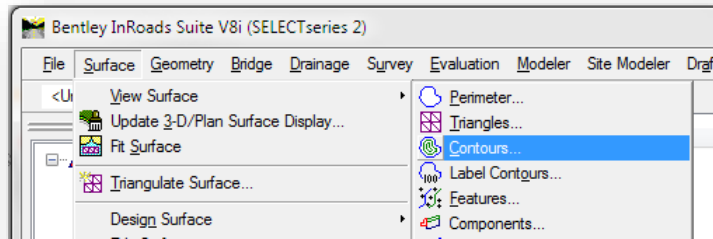
**View Surface -> Contours**

2. On the View Contours dialog, select the Preferences button and the load the IN Existing Contours preference and the select Apply on the View Contours dialog. This will draw the existing contours on the .dgn.
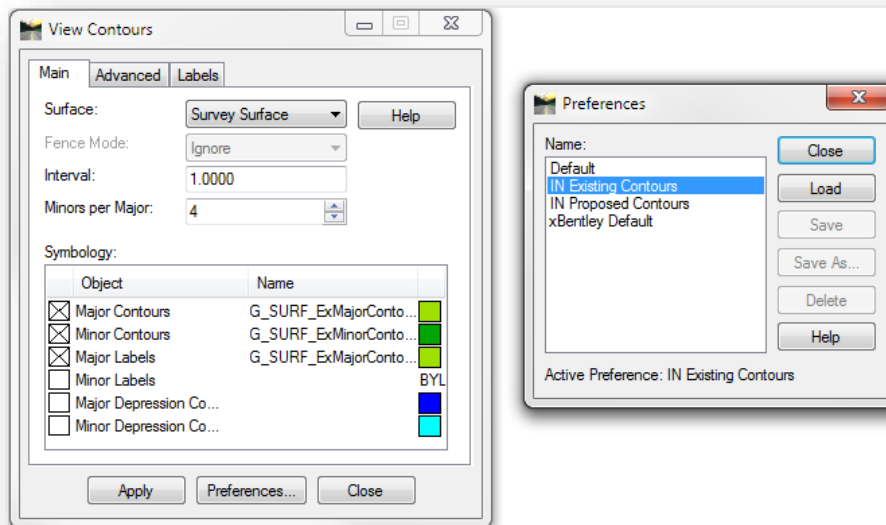


**View Contours Dialog and Preferences**

3. Perform steps 7 and 8 from the previous section to shut off the contours. The major and minor contours are on separate levels, so look for G_SURF_ExMajorContours and G_SURF_ExMinorContours.

### 6.3-7   Surface Boundaries

Now we need to create the survey surface boundary. Using the InRoads surface tools, create and clean up your triangulation. These steps will pick up with the triangulation being cleaned up and preparing for the display and import of a perimeter boundary.

1. With the Triangulation cleaned up, navigate to *Surface -> View Surface -> Perimeter*.
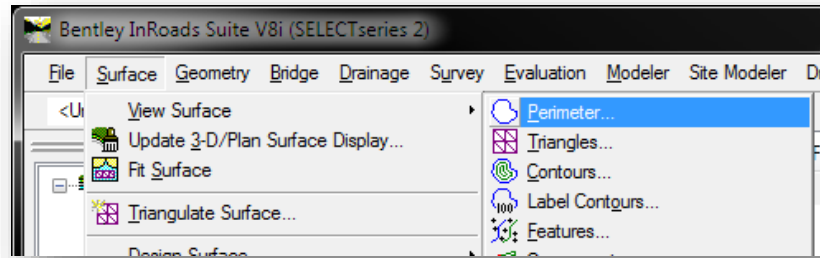
**View Surface, Perimeter**

2. With a perimeter displayed, navigate to *File -> Import -> Surface*. Make sure the From Graphics tab is active.
3. Configure the Panel as shown. This procedure will need done twice; once with the Surface set to the active Survey Surface and a second time with the Surface set to Surface Boundary to create the required boundary surface. Make sure your seed name and feature styles are both defined appropriately, along with the point type set to Exterior. Upon hitting apply; you'll be prompted to select the appropriate graphical element for import.
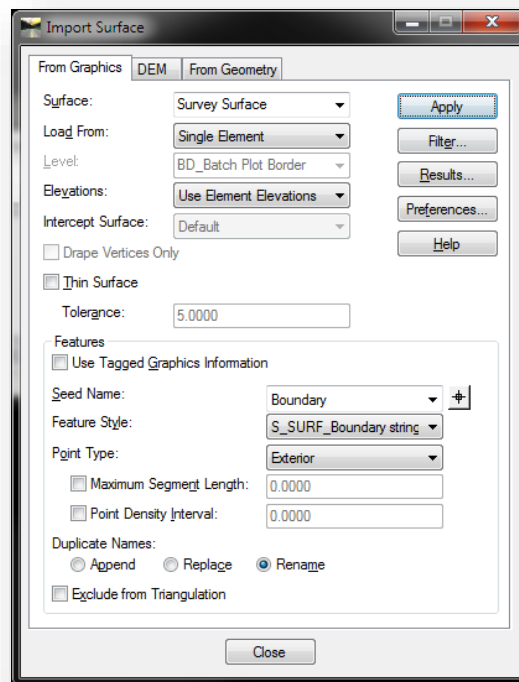


**Import Surface Options**

4. At this point you'll have a new surface show up on the Surfaces tab. Save this document using the same method we did for the .fwd file in the previous example.

### 6.3-8   Creating the Geometry/Alignments (.alg file)

1. Create a new Geometry Project by accessing the Geometry tab, right clicking on Geometry Project, and selecting the *New* command.   Create your new Geometry Project with the name Survey Alignment.
2. At this time, create the relevant Horizontal alignments by right clicking on your Geometry project and selecting New.  On the New Panel select the Geometry tab and change the type to Horizontal Alignment.  Additionally, make sure your feature style is set to S_ALG_Alignment.  Your settings should look similar to those in the following illustration:
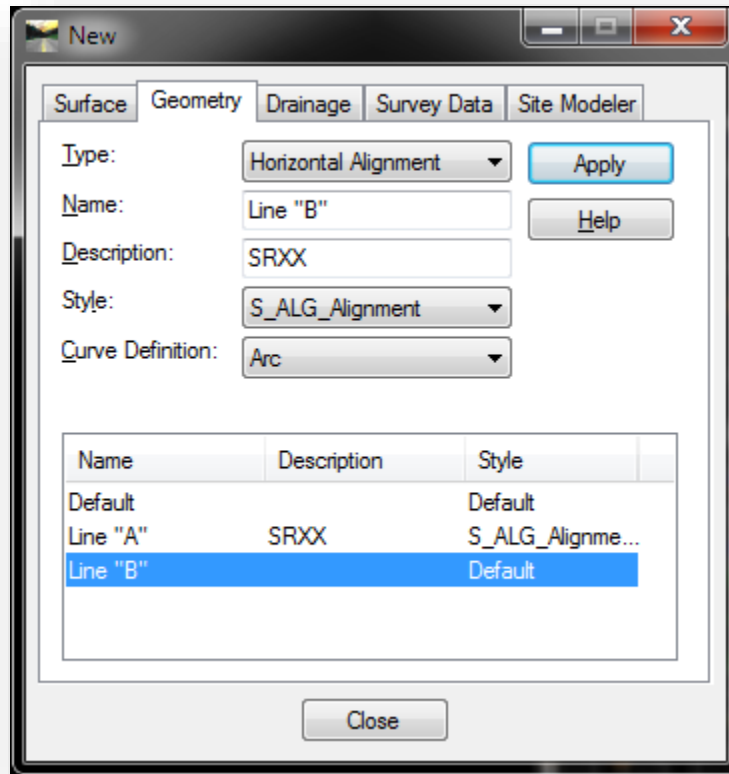


**New Horizontal Alignment**

3. At this time, you should save your .alg file into ProjectWise as we did in the previous examples.
4. With the horizontal alignment created, you can now use the InRoads geometry tools to create alignments within this project.

### 6.3-9   Drawing/Verifying Topo in the Des #_SRxx Topo.dgn

With all our InRoads files now created, we can proceed on to finalizing the content of the *Des #_SRxx Topo.dgn file* and verifying its contents.

### 6.3-9a    Drawing up TOPO features

To perform this action, you'll need your Topo .dgn file open, along with InRoads running and the relevant .dtm, .alg, and .fwd files open and active.  We'll examine drawing up surface features, alignments, and fieldbook features such as point names.

### Drawing Surface Features

1.  Start up the Global Scale Factors dialog from the InRoads Tools menu -> Global Scale Factors.  Details on making this tool available are in section 5.6 Global Scale Factors. Configure your scale for all features as needed.
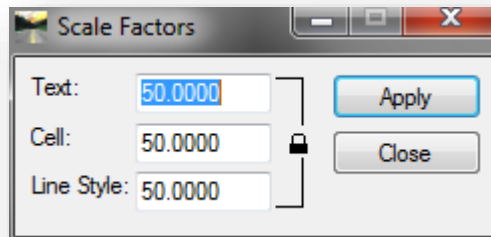


**Global Scale Factors set to 50 scale**

2.  Make sure the appropriate surface is open and active on the InRoads Explorer.  If it's not, open the .dtm file and then right click on its entry and select *Set Active*.
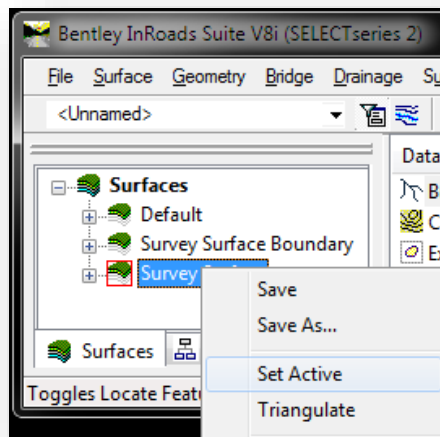


**.dtm Set Active**

3.  With the appropriate surface active, navigate to the *Surface -> View Surface -> Features* menu option on the InRoads Explorer.
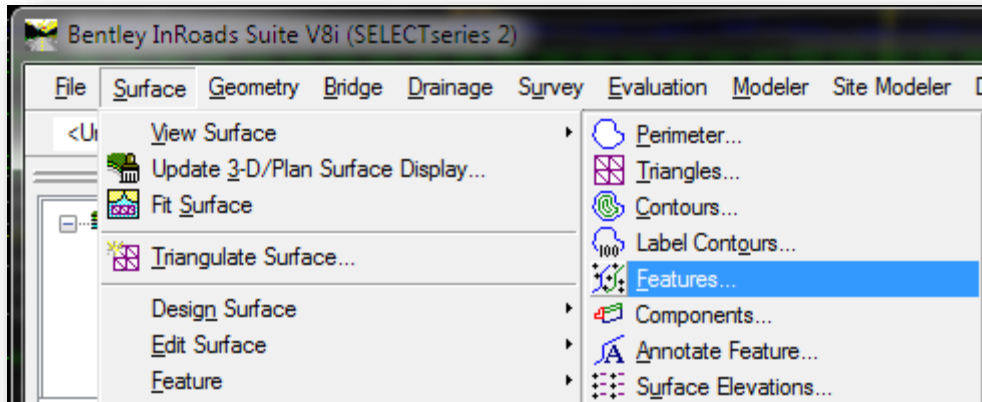
**View Surface -> Features**

4.  On the View Features dialog, make sure that all the items you'd like displayed are selected. Note that you can right click in the Features list and invert your selection, or select or deselect all items.
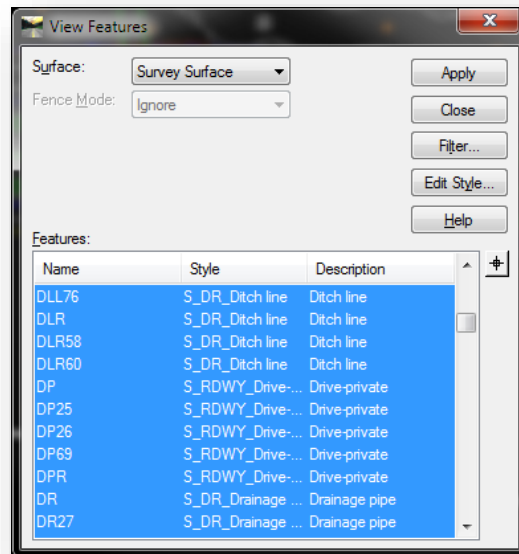


**View Features**

5.  When satisfied with the features selected to be drawn up, select the Apply button. Your topo features will be drawn up in the DGN at this time.

*Drawing Alignment Features*

1.  As in the previous example, make sure your global scale factors are set appropriately and that the correct Geometry Project is active, along with any alignments.

2. There are multiple ways to display an alignment. The most direct method is to right click on the horizontal alignment in the InRoads Explorer and select *View*. This will draw the selected alignment in the drawing.
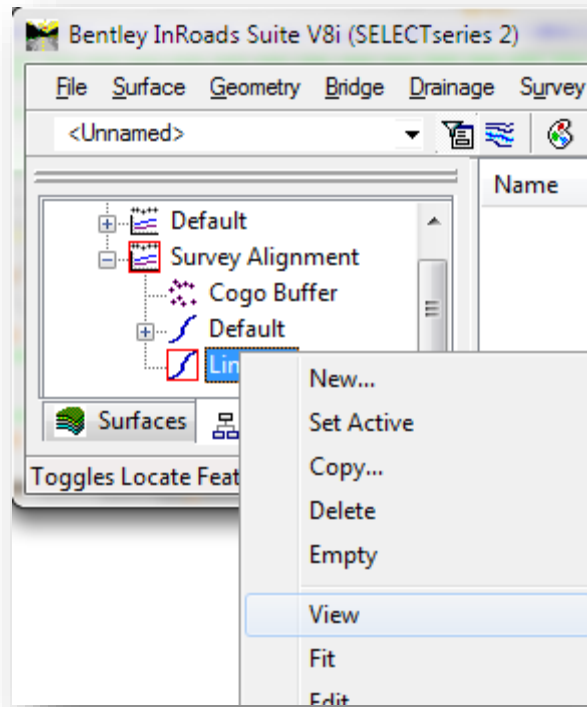


**Horizontal Alignment -> View**

3. The other method, along with any of the other geometry annotation features can be found under *Geometry -> View Geometry*. To draw the alignment, select Active Horizontal.
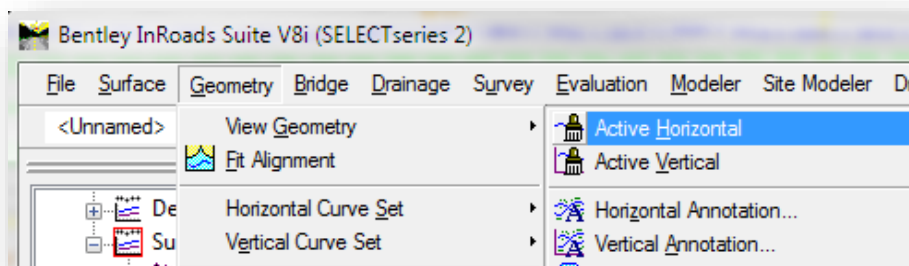


**View Geometry -> Active Horizontal**

4. Should you require any additional annotation or information on items such as COGO points, you will use the *View Geometry -> Horizontal Annotation* tools.

*Drawing Fieldbook Information*

1. As in the previous example, make sure your global scale factors are set appropriately and that the correct Geometry Project is active, along with any alignments.  Remember you can use the Preferences to select one of the predefined sets of Survey options.

2. The current InRoads defaults are to display planimetrics at all times.  In order to draw these graphics, or any of the other fieldbook features, navigate to *Survey -> View Survey -> Write Survey Data to Graphics* from the InRoads Explorer.
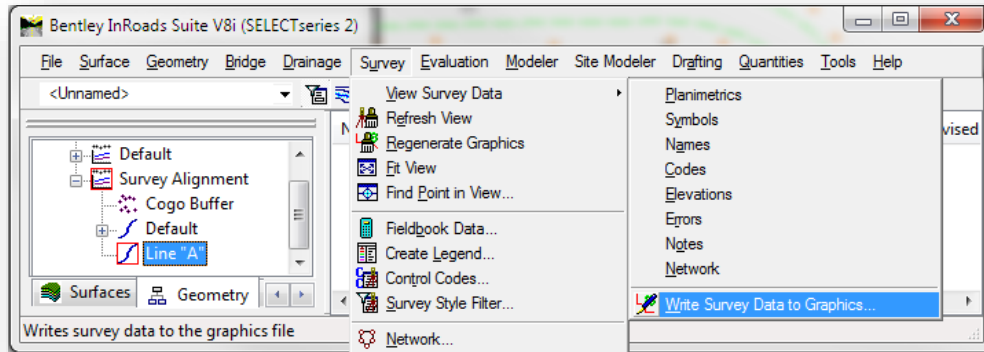


Write Survey Data to Graphics

3. On the Write Survey Data to Graphics panel, select the features you'd like to have written to permanent graphics.  Note that these graphics will be displayed based on the active survey scale and will not automatically scale based on zoom level.
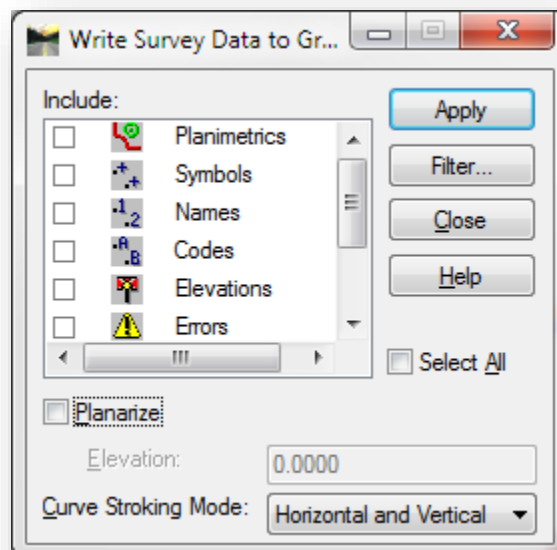


Survey Data to Graphics Settings

4. When satisfied with the items you've selected, select apply to create the permanent graphics. Note that you can filter these to specific features, point number ranges, or codes. This tool will also allow for the easy display of point names, codes, and elevations directly in the .dgn.

### 6.3-9b      *Verifying Topo using 3D Rotation and Shading the Triangulation*

The View toolbar (located in the upper left of the view window) gives us access to rotate 3D drawings to any one of 9 predefined Views.

Isometric Views and Right Isometric View are the most useful to rotate quickly to a 3D orientation. Option number1 – Rotate View allows dynamic view rotation.
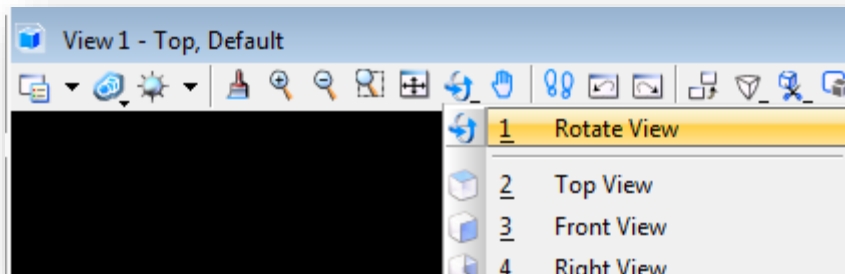


Results will be similar to below.
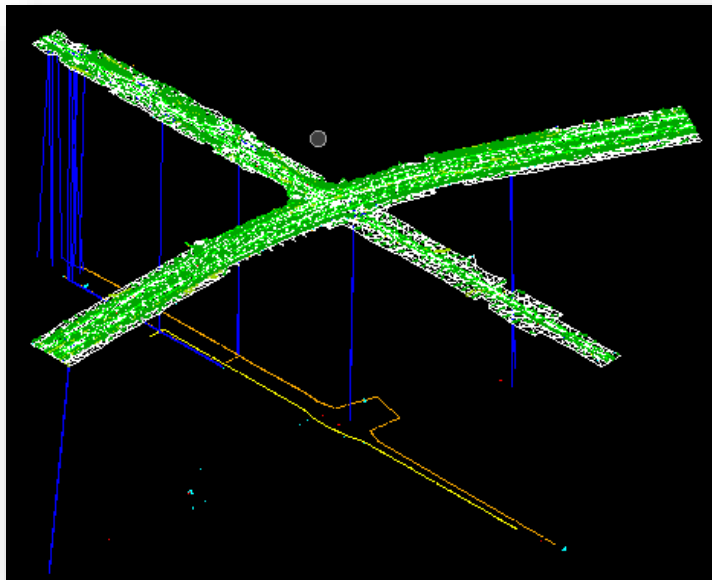


Note:   Alternate access to 3D rotation can be obtained from mouse functions. This involves the Alt-Middle dynamic rotation. This is also the same as Option 1 Rotate View - dynamically

*Alt & Middle click*
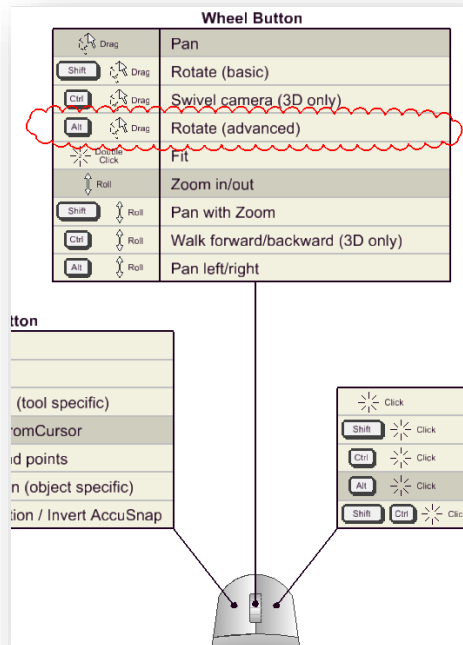


The Drawing View will have a crosshair placed in the drawing.  This is automatically placed at the center of the graphical elements in the drawings.
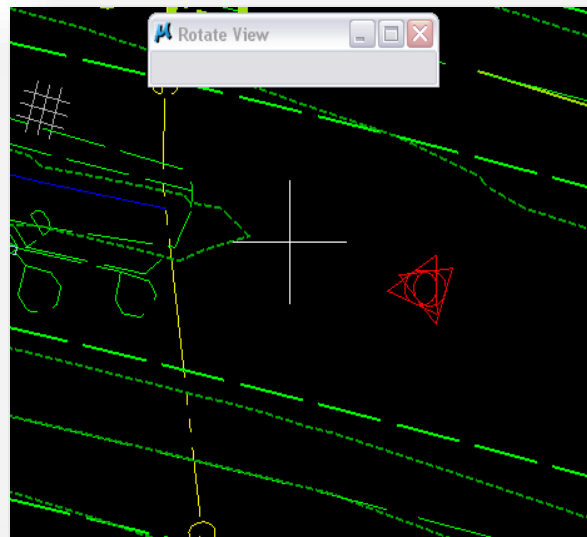


Any subsequent rotation will be about this point unless you dictate otherwise.  (This is rarely the desired location.)

The rotation origin can be modified by tentatively snapping to the desired location (left right chord) or by graphically dragging the cursor to a new location. When the cursor is moved over the crosshairs they become highlighted as shown.
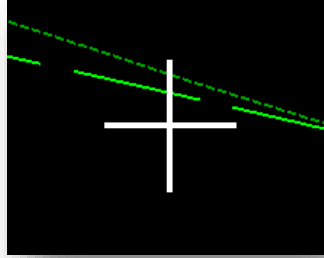


Press and hold the left mouse to graphically drag to a new rotation origin. AccuSnap is particularly useful in this operation. When the left button is released, so is the cursor at the new location.

Subsequent left mouse dragging will dynamically rotate the drawing. (Make sure you are no longer over the origin.)
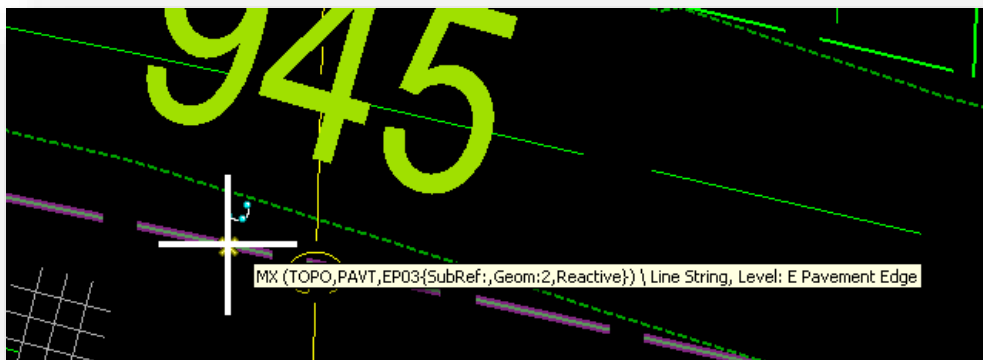


Results of left drag with triangulation displayed as reference:
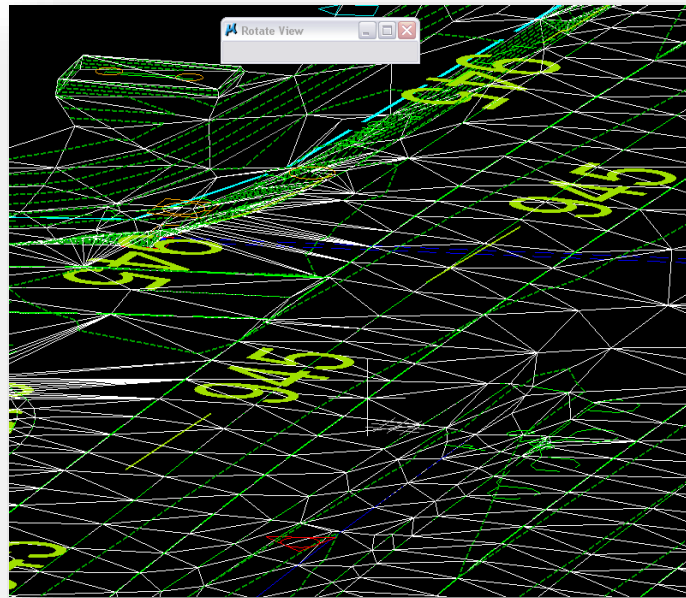
Note:    Subsequent panning and additional Dynamic rotation will change the perspective, allowing us to see any portion of the project from any angle

## *Returning to Plan View*

In CAD the normal Plan View as we are accustomed to describing it, is referred to as Top View.

Simply select the icon to the right of Fit view.
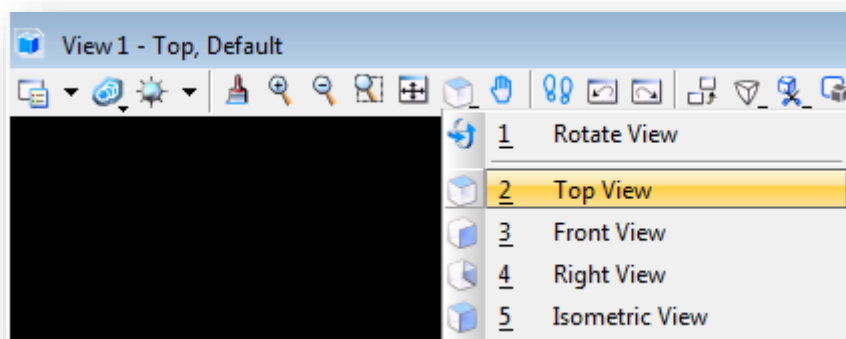
Resulting view:
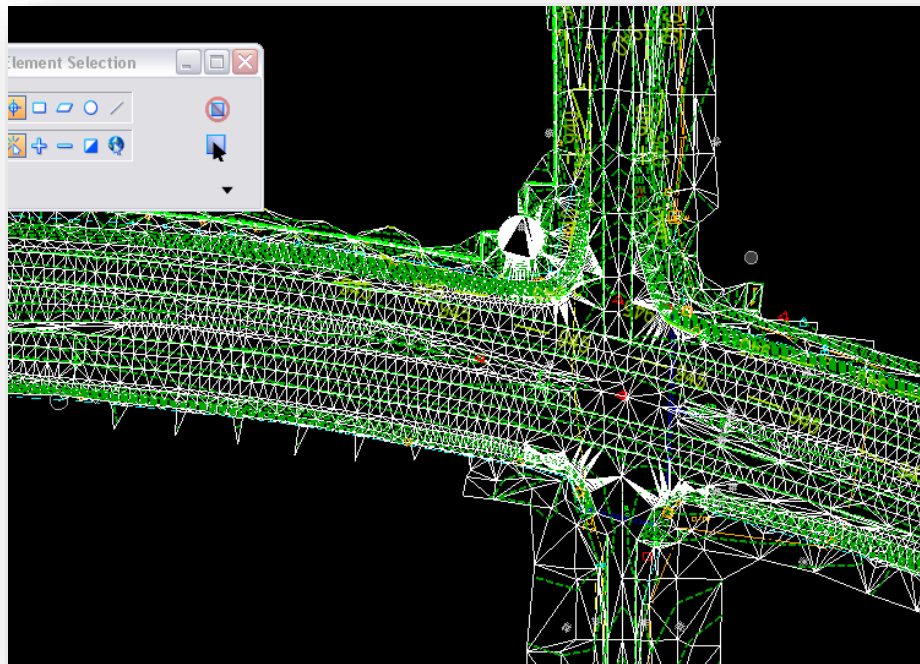


You also may wish to verify the triangulation by applying shading to see if any holes exist.  With your triangulation displayed, click on the View Attributes button on the upper left hand corner of your active MicroStation view.  The very top option for presentation will be listed as wireframe by default. Change this setting to smooth as shown, and your triangulation will look as shown.
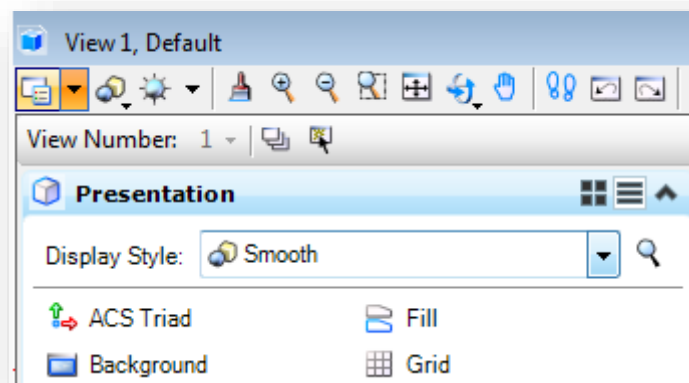


**Smooth Shading on View Attributes**
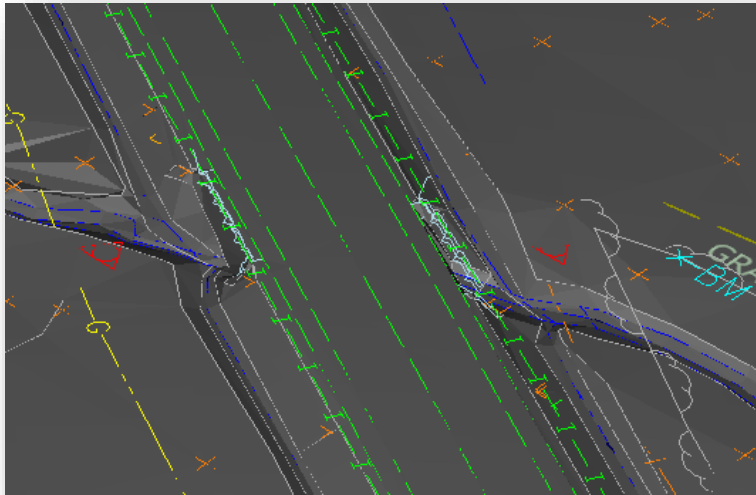
**Topo with Smooth Shading**

You can switch back to the wireframe display by performing the same steps, changing from Smooth and back to Wireframe.  Note that there are additional display styles available that can also be used.

## 6.4        Routeplat, Reference Box and Section Corner Card Creation

The following sections will walk through the process to create a complete route plat sheet.  This will include creating the file in ProjectWise, examining its contents, and working with/referencing section corners.

### 6.4-1    Creating the Route Plat .dgn file

Prior to placing any content into the route plat, we need to create a drawing to work in.  This process will be same to the steps performed in section 6.2-1 Creating the Topo Drawing in ProjectWise.

Using these steps, you'll need to make two adjustments.

1.  When selecting your seed file, select the appropriate unit file from:
    pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template
    Documents\Seed\MicroStation\Survey Seed Files\
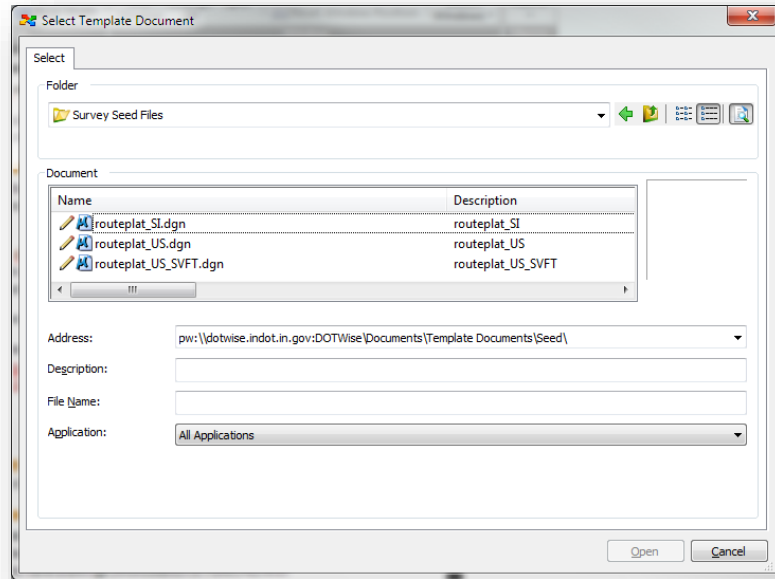
**Selecting a Route Plat Seed**

2. Your document name, description and file name should all be set in the Des #_SRxx LCRS Plat.dgn format.
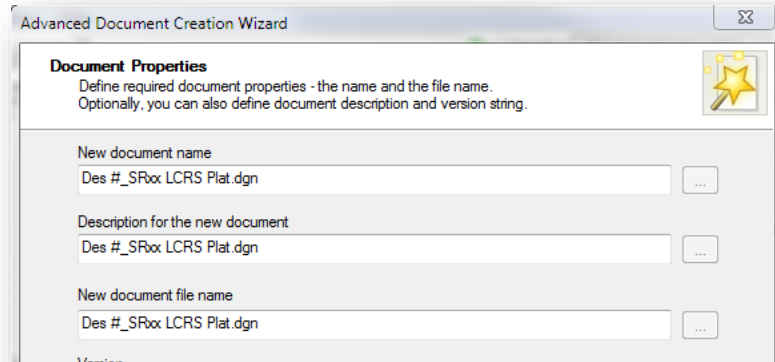


**Route Plat naming**

### 6.4-2   Contents of the Route Plat template files

Each of the route plat templates contains five models.  These can be accessed by going to the model icon in your MicroStation toolbars:

**Accessing the Models Dialog**

By selecting this icon, you'll be presented with the following window and list of available models. The plat sheet will come up by default:
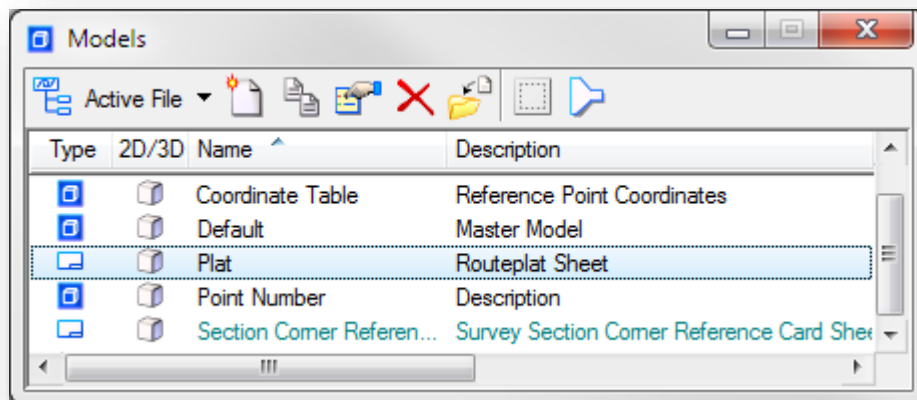


**Available models in the template**

The five models available are:

1. Coordinate Table – This is the template Reference Point Coordinate Table.
2. Default – This is the default MicroStation model, and is available in all .dgn files.
3. Plat – This is the template route plat sheet model.
4. Point Number – This is the template reference box model.
5. Section Corner Reference Card Sheet – This is the template Section Corner Reference Card Model.

### 6.4-3 Creating Reference Boxes

The following steps go through the process of creating a model containing the control point reference box for use in either Route Plat Sheets or the Section Corner Reference Card.

1. Open your Des #_SRxx LCRS Plat.dgn from ProjectWise.
2. As shown in the previous section, open the models dialog from the toolbar icon.
3. On the Models dialog, double click on the Point Number model to open it.
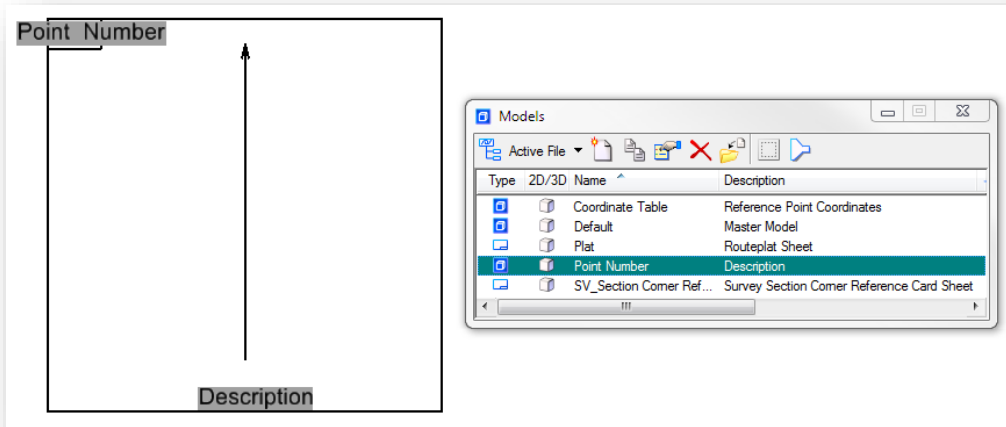
**The Point Number model open in MicroStation**

4.  Select the Copy Model icon from the Models dialog.
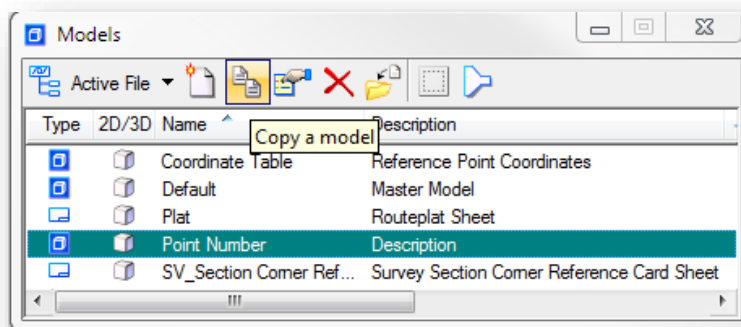


**Copying a Model**

5.  The Point Number model has active field as shown in the earlier capture (the gray shaded areas for Point Number and Description).  During the model copying process, you'll be prompted to create the new model with a new name and description.  The values for point name and description should be entered as you'd like them to appear on the completed control point.
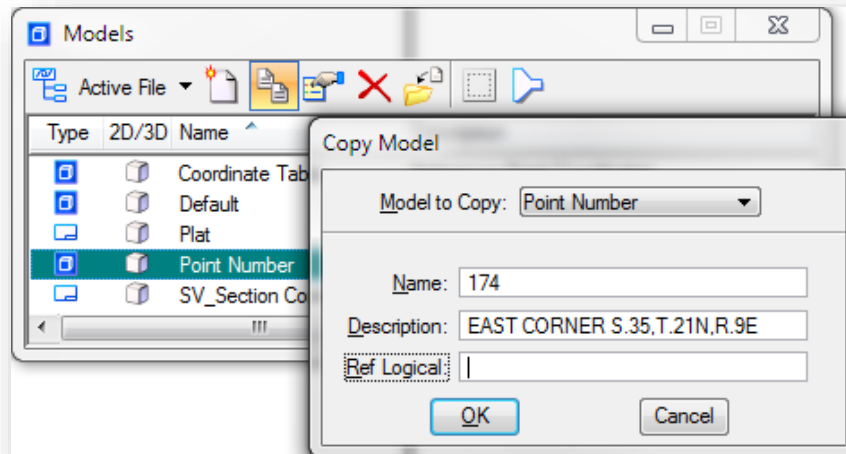
**Point Number Model Copy**

6. Once the model information has been entered, select OK. The completed model copy will become active, and will show the name and description in the control point as shown. Repeat steps 4 and 5 for each additional reference box you require.
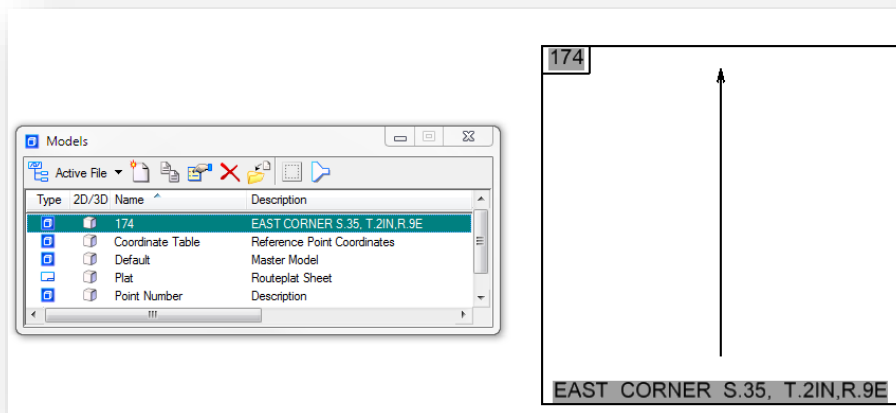


**Completed Point Number Model Copy**

7. Next, the control point content needs created. If not active from the previous steps, enter your control point model by double clicking on its listing in the Models dialog. Once in the appropriate model, open the Survey task from the INDOT Tools workflow in MicroStation:
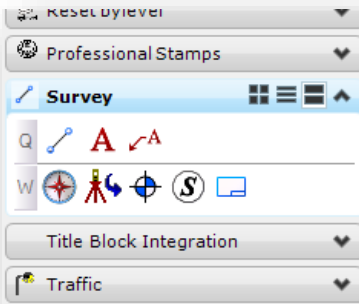
Survey Tasks

8. First we'll add the north arrow. Load the Survey Symbols library from the Survey task.
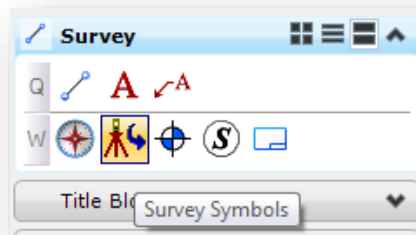


Survey Symbols

9. This will load the Survey Cell Selector. On the displayed panel, locate the cell called northsy. *Do not use northsymb as it is scaled differently.* Clicking on the northsy button will bring up the cell placement tools at the appropriate scale. At this time, place the cell in the correct spot in the control point border. Note that cells are sorted by letter case then alphabetical order. (PSSA would show up in the list before northsy as the capital P takes precedence)
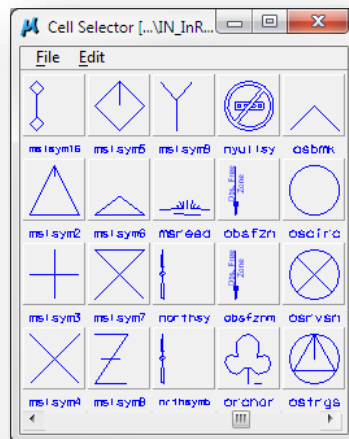


The Survey Cell Selector

10. Next locate the cells for the traverse station cell (PSSA) and any other object that needs placed. In each of these instances, a scale of 0.1 should be used. Snap this cell to the center of the provided centerline.
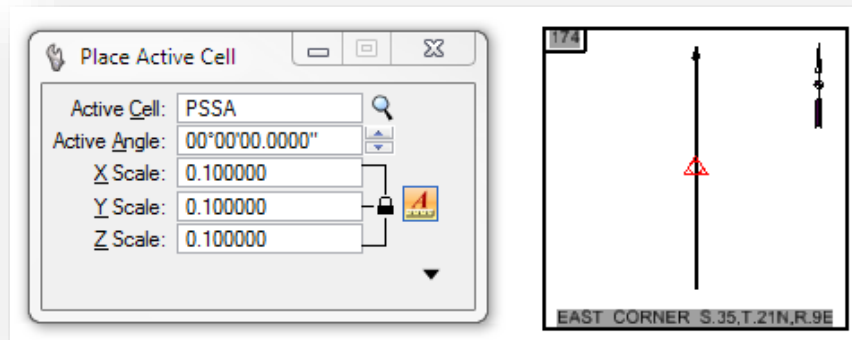


PSSA Cell Placement

11. After placing additional cells such as power poles (PPWP), you will need to place the lines for the dimension ties. From the Survey task, select the Place Line command.
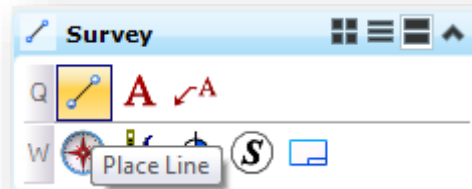


Place Line

12. While in the place line command, you'll want to snap your initial point to the center of the PSSA symbol on the centerline.
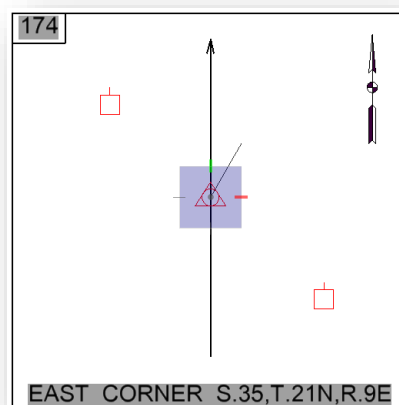


Drawing Dimension Ties

13. Next, in your AccuDraw toolbar/window, place your cursor in any of the fields and hit the space bar to set it to angular mode.
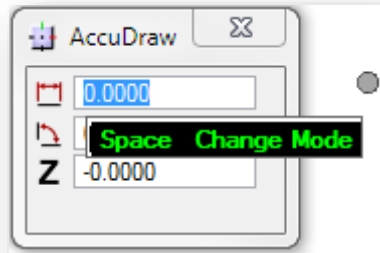


AccuDraw Mode

14. At this time, place your cursor in the angle field and enter the appropriate value.  This will also lock the angular value in allowing you to draw the line along the bearing you've specified.  Remember to specify degrees, using the ^ symbol (shift key + 6).
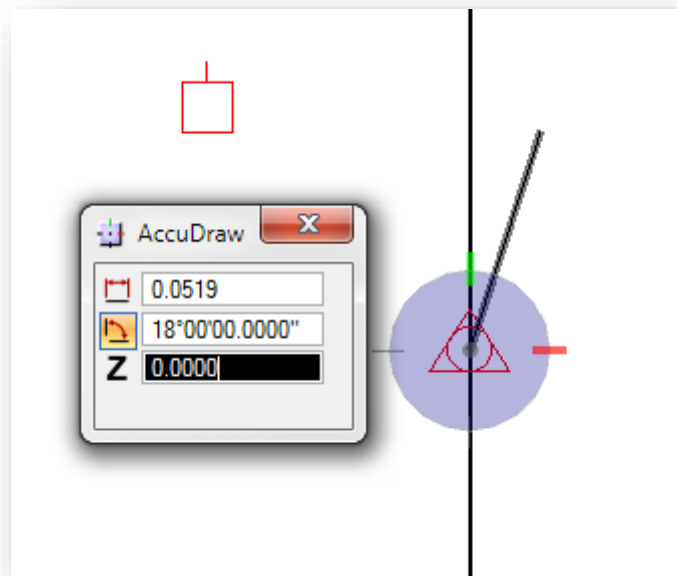


Dimension tie

15. With the lines drawn, you can now adjust the placement of any cells that you've placed and your resulting reference box should look similar to the following:
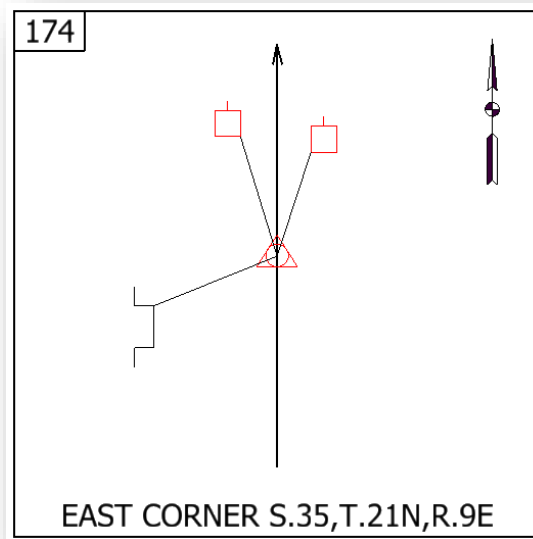
**Reference Box**

16. Next, you'll need to add the text labels to the Reference Box. Start by selecting the Place Text tool from the task navigator. You can find this either on the Drawing task, or from the INDOT Tools -> Survey Task.
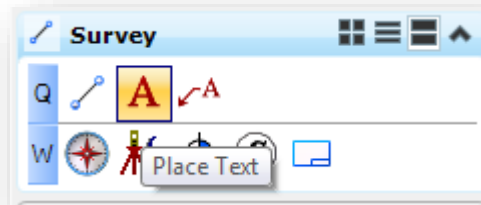


**Place Text**

17. With the Place Text tool active, first set your Text Style to 10 Point Text. This will initiate the appropriate justifications and sizes. Due to the constrained size of the reference boxes, we will adjust our font to the Bentley Working font as shown. Expand the dialog by clicking on the arrow in the lower right hand corner and select 1 Working from the Font section. Note that upon changing the font, the Text Style field highlights itself blue. This denotes that you've adjusted the font from the default style.
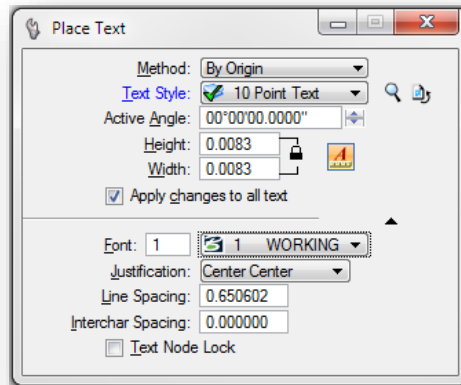
**Place Text Settings**

*A note on Text Styles*

As shown in the previous steps, we are deviating from the standard font applied to the 10 Point Text style, which will cause your text styles to become out of sync with the dgnlib. In order to revert your text style to the appropriate values, either select the Reset Style button on the Place Text panel as shown:
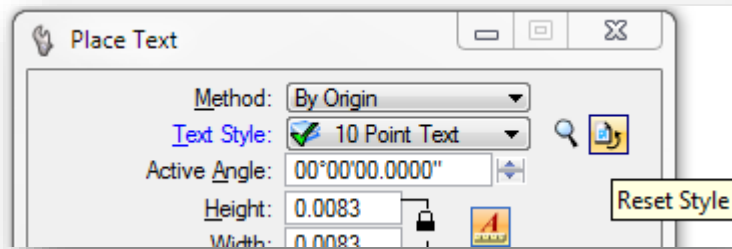


**Reset Style**

Or you can reset the style from the Text Styles dialog located under Element -> Text Styles on the MicroStation menu. When you locate the style that no longer matches (it will be denoted with a Δ), right click on it and select "Update from Library".
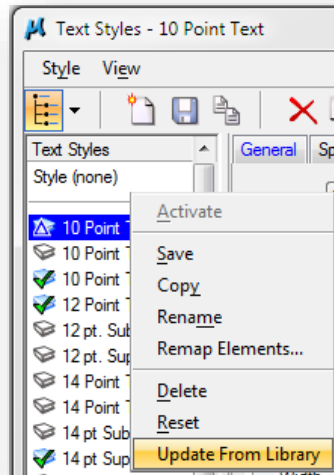
Update from Library

In addition to adjusting the font, it may also be desirable to adjust the Justification options to more appropriately place your text along, above or below elements.  Again, you can revert back to the default text style settings using the methods shown above.

*More notes on Text Placement*

Various notes may require the use of special characters not directly accessible via the keyboard, such as the degree symbol.  There are two ways to place this and other symbols.  The first method is via the Insert Symbol button on the Text Editor.  Selecting this button will bring up a fully illustrated list of the available characters in the active font.  Via this browser you can find the symbol, insert it into your text and quickly add it to the symbols favorite list.
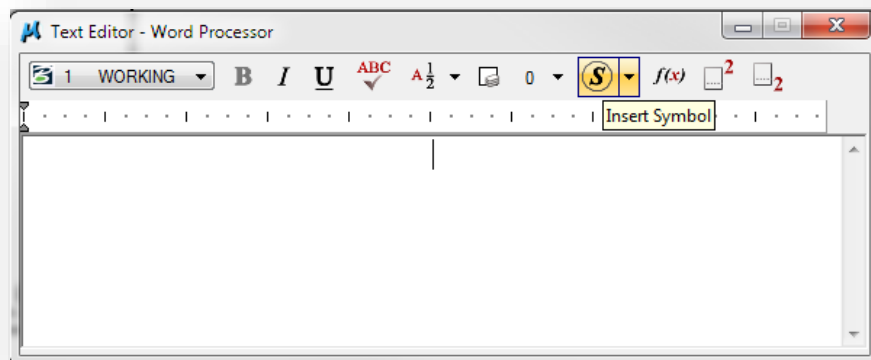


The Insert Symbol Tool
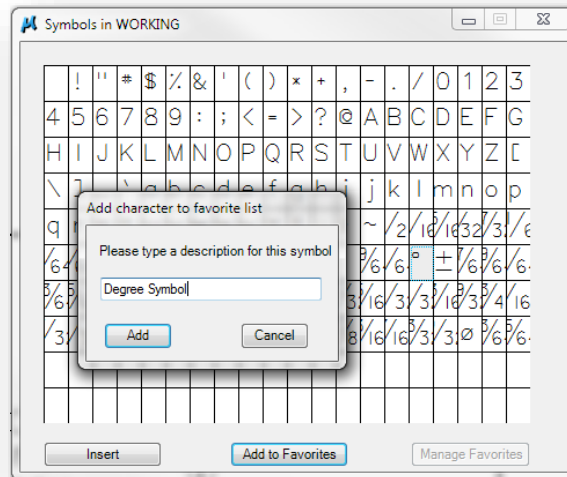
**The Symbol Browser and Adding to Favorites**

Additionally, if you know the appropriate key-in sequence, you can type the symbol in. In the case of the degree symbol and the Working font, you can type it in by holding down the ALT key, then typing 9 then 4. This will place a ^ in the text editor, however when going to place the line of text, a degree symbol will appear.

18. After placing the appropriate labels, your reference box should look similar to the following.
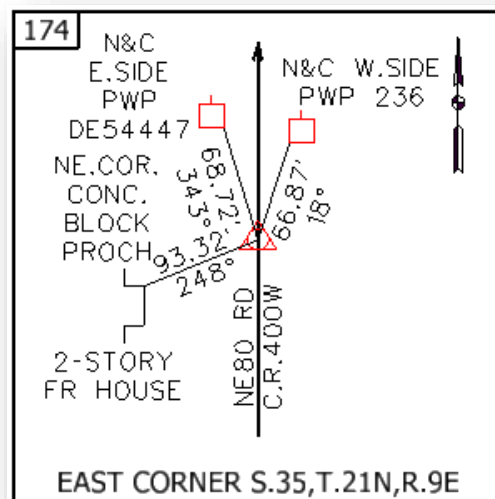


**Reference Box with Labels**

19. Finally we need to place the note describing the monument type. Similar to the Place Text tool, we will need to start the Place Note tool. This tool can also be found in both the locations mentioned in step 16.
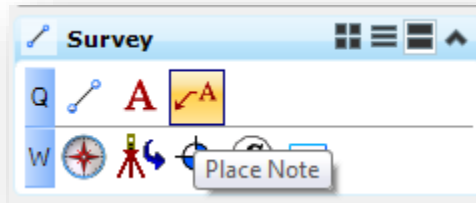
**Place Note**

20. With the place note tool active, set your Text Style to 10 Point Text, the Dimension Style to Engr Arrow, and your Text Frame to Box as shown.
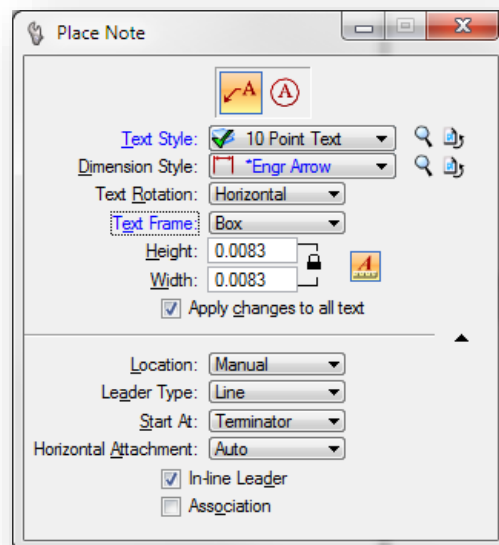


**Place Note Settings.**

21. Next, on the Text Editor, change your active font from Tahoma to the Bentley Working font.
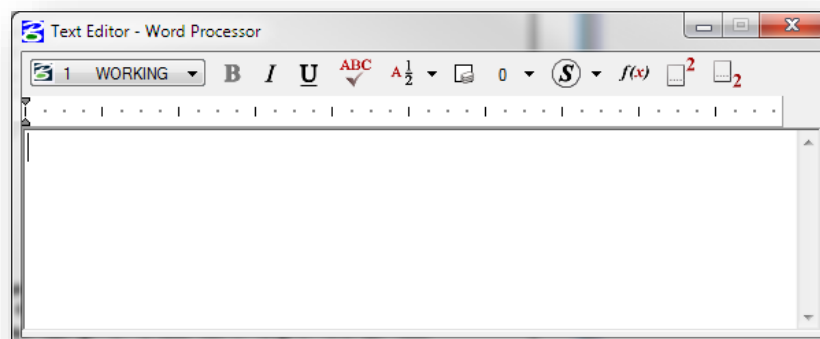


**Setting the Working Font**

22. With the Place Note tool configured, type the monument information into the Text Editor. When the text is typed, place your cursor on the monument in the reference box and select the location where you'd like to start the terminator. A second placement will determine the leader length and direction and place the text box. The resulted reference box will appear as follows:



Completed Reference Box

23. At this time you may need to restore your text and dimension settings to their default configuration. These steps are noted in tips throughout this section and are similar for text and dimension styles. With this first reference box created, you can now create additional reference boxes for each point in the plat.

### 6.4-4   Creating the Reference Point Coordinate Table

Since the coordinates for the Reference Points are no longer contained in the Reference Box, a Coordinate Table will need to be created. It is recommended to create one overall coordinate table for the Route Plat. The following steps go through the process of creating a Coordinate Table.

1. As we did with the reference box, we're going to use the Models dialog to copy the template model included in our .dgn file. Open the Models dialog and copy the Coordinate Table model.

**Copying the Coordinate Table**

2. With our table copied, make sure the new model you created is active. If not, double click on it in the Models dialog to activate it.

3. All the text in this table is editable via the standard text editing tools in MicroStation. Using either the Edit Text tool, or by double clicking on the pieces of text, edit the values for your coordinate table accordingly.

### 6.4-5    Adding the TOPO to the Routeplat Sheet

With our reference boxes and coordinate tables created, we can now begin the process of creating the route plat sheets and populating the file with content.

1. As we've done in the previous two examples, take the template routeplat provided in the .dgn and copy it to a new model.
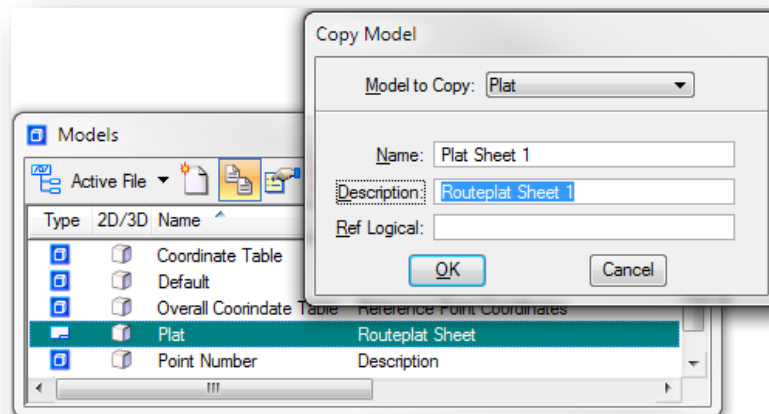


**Copying the Plat Model**

2. If not opened automatically, double click on your newly created model to activate it. Should you need additional plat sheets, repeat step 1 as needed.

3. Now that we have a new routeplat model created and open, we can begin adding the various pieces of content.  When first entering the new routeplat model, you will see the following template information:
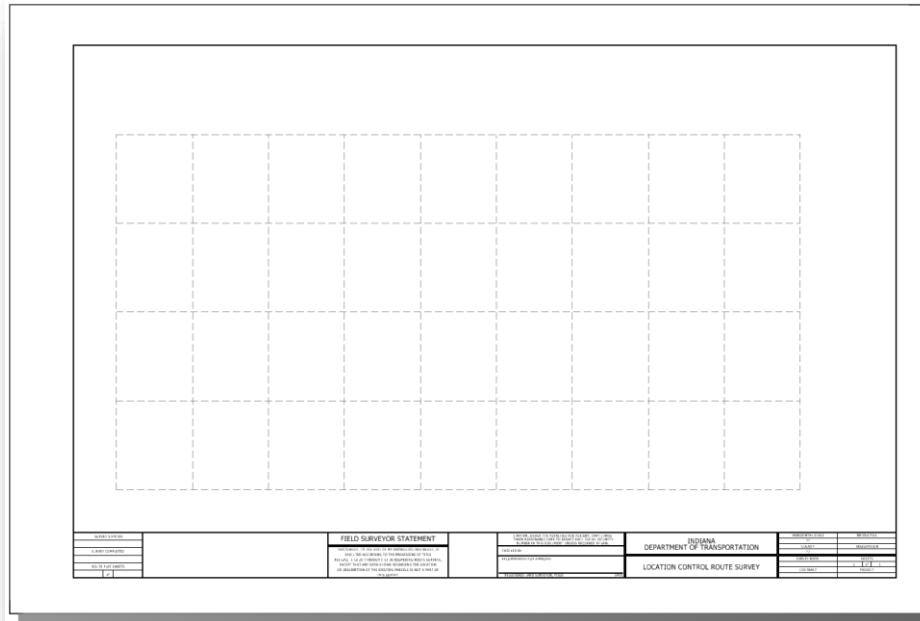


**The Template Routeplat**

As you can see in the following illustration, the template contains the appropriate border file and a grayscale border all in a sheet model (denoted by the virtual paper size around the border).

4. At this time, we're now ready to begin adding content to this file.  The vast majority of content that we'll be adding will be via MicroStation References.  Open the References dialog from the MicroStation toolbar.



**MicroStation References**

5. The first item we'll attach is the topo drawing we've created for our project.  Start by selecting the Attach Reference button from the Reference dialog.
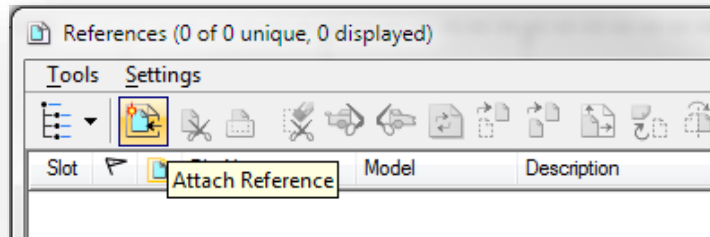
**Attaching References**

6. Unlike the prior version of our referencing procedures, we've created all our content in a single topo .dgn file and are using the levels to control visibility. As such, when prompted for the file you'd like to attach, select your single topo drawing as shown. Make sure to set the attachment method to Interactive so you can adjust the scaling and view orientation.
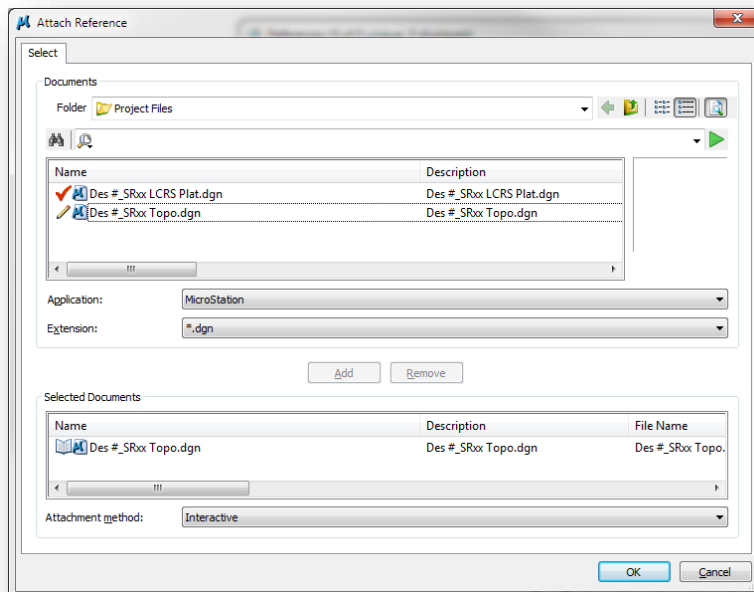


**Reference Attachment**

7. With your topo selected, select okay and configure the additional settings for your attachment. The following illustration shows the attachment made at 1"=100'. Please note that on this panel we've selected Coincident as our Orientation.
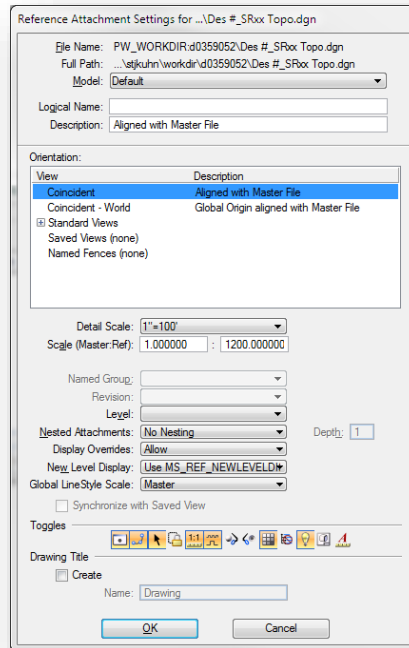
**Attachment Settings**

8. As we've selected a Coincident attachment, your topo will not appear within the border. We need to move our topo back into the border. Start by zooming extents, and then in the References dialog box, choose all the attached reference filenames you want to move, and select the *Move References* tab.
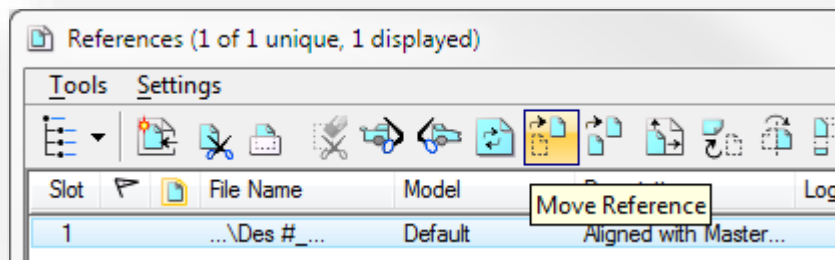


**Move References**

Left click at the location in the drawing you want to move the files from and then left click at the location in the drawing you want to move the files to. This will move all the selected files to the new location.

9. Be sure to save settings by hitting *Ctrl + F*, or selecting *File -> Save Settings*. This will ensure that the changes you made to the reference files will be saved for next time.

10. If you need to clip the reference, the easiest way is to use a fence. Select the Fence tool from the Task Navigator.
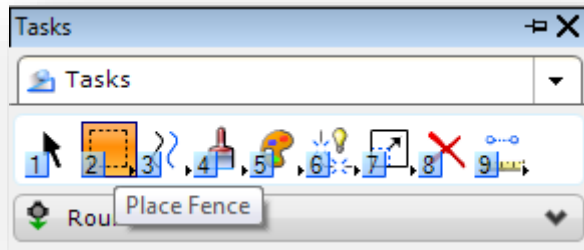
**Place Fence**

11. On the place fence tool, make sure your Fence Mode is set to Inside. In most instances, you can leave the Fence Type set to Block, however it may be advantageous to use one of the other fence methods to achieve a tighter clip around your topo.
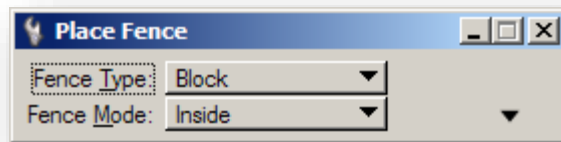


**Place Fence Tool Settings**

12. With your fence placed around your topo, you now need to select the Clip Reference from the References dialog as shown. On the Set Reference Clip Boundary, make sure the Method is set to Active Fence. When satisfied with the boundary fence you've defined and the clipping settings left click in the drawing area to accept the clipped reference settings.
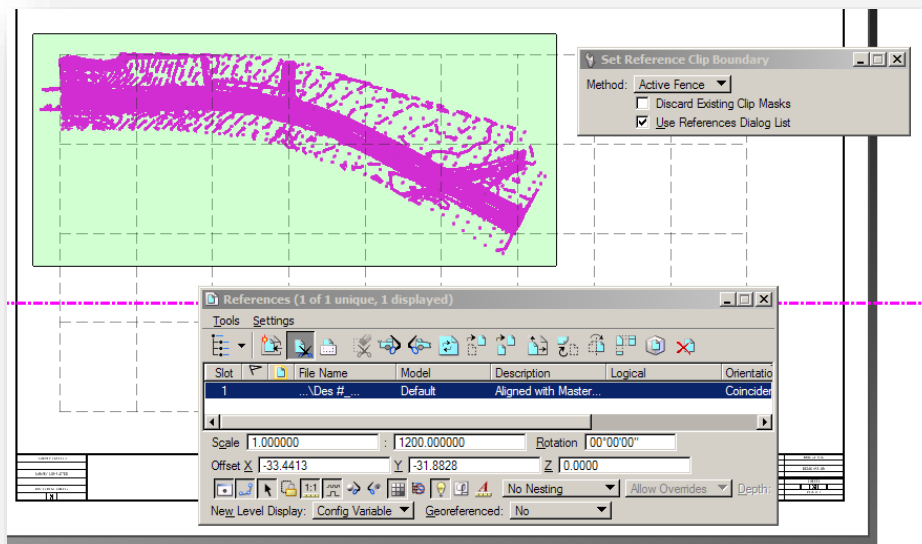


**Reference Clipping**

*Note: You could draw a polygon and change its Class to Construction. Then by changing the Fence Type to Element you can create the fence by selecting the polygon. This would give you a way of recreating the same clip area for additionally attached reference files.*

13. Be sure to save settings by hitting **Ctrl + F**, or selecting **File -> Save Settings**. This will ensure that the changes you made to the reference files will be saved for next time.

### 6.4-6   Adding Reference Boxes to the Routeplat Sheet

Now that we've added the topo to the route plat, we need to add the reference boxes to the sheet. Continuing from the previous set of steps, make sure that you're in the appropriate Plat model; otherwise open it via the models dialog as noted in step 2 of the previous section.

1. With the plat sheet showing in our MicroStation view, you should see the frame your topo and a dashed grid setup in the sheet. If you don't see the dashed grid we need to enable it with the following steps.
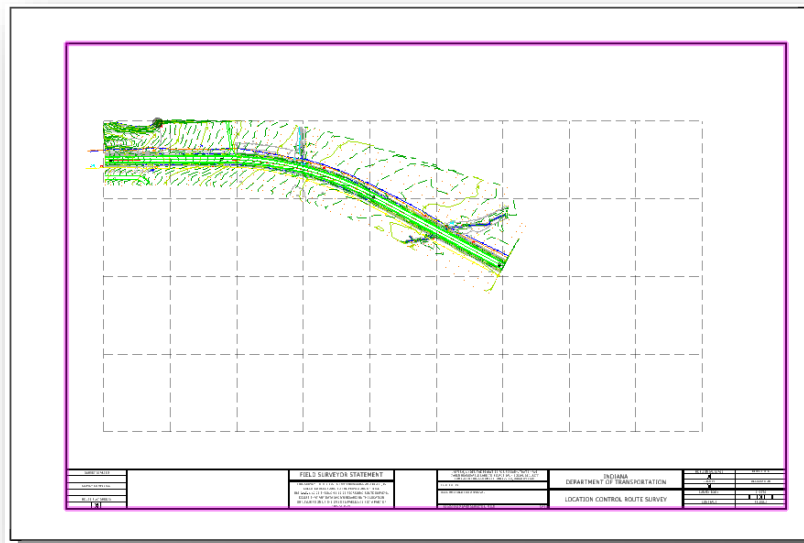


**Routeplat with Topo and Grid**

2. If the grid isn't visible, enable the Constructions option on the View Attribute panel. This panel can be found on the View toolbar.



**View Attributes**

3. The Constructions item can be found on the left side of the panel. Make sure it's highlighted as shown in the following capture:
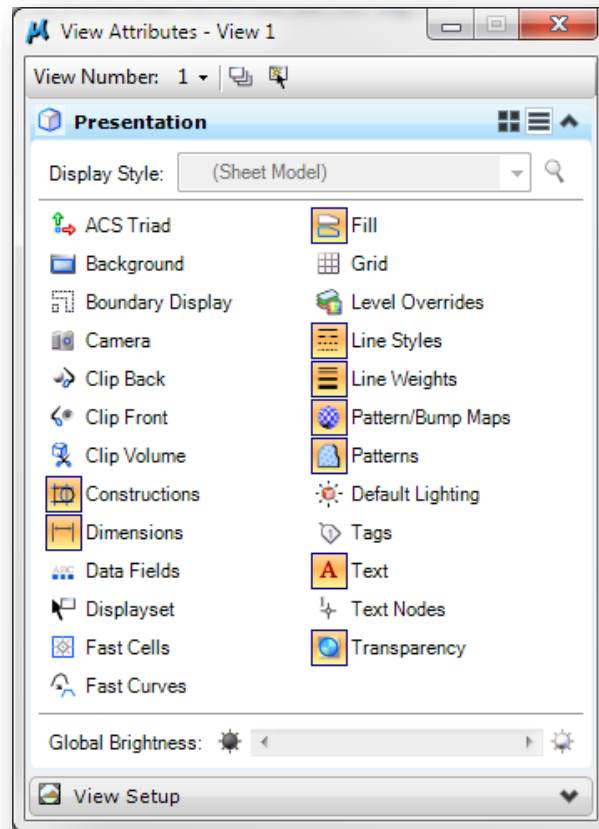


Constructions Elements Enabled

4. At this time, we want to open both the Models and References dialog boxes from our Primary Tools toolbar. They sit next to each other as shown:



Models and References

5. With both dialogs open, we can now drag our Reference Box models from the models dialog and directly attach them to our Plat as references. Note that you can drag and drop multiple references boxes at the same time on this dialog. For this example we will only be attaching a single reference box.
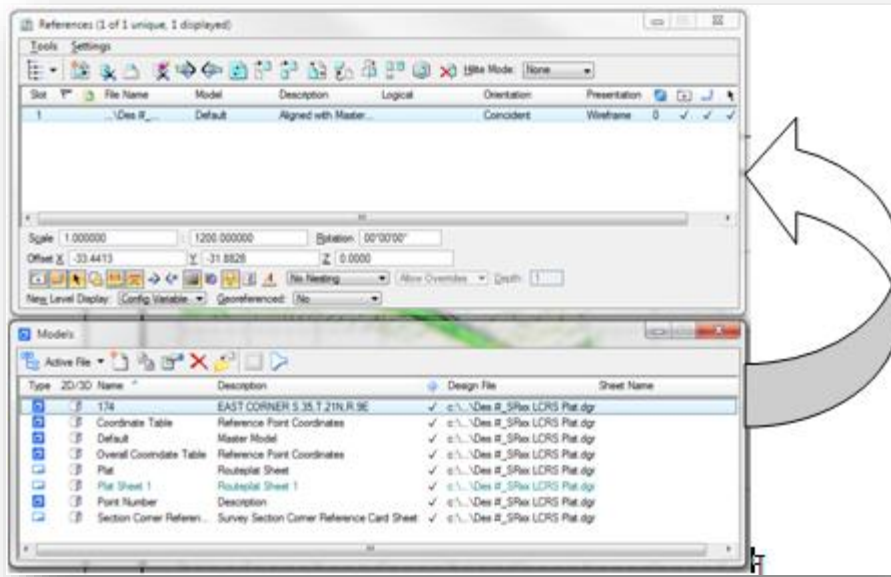
**Reference Box Attachment Drag and Drop**

6. Upon completion of the drag and drop, you will be prompted with the *Attach Source Files* dialog requesting you to adjust the alignment of the references being attached. For our reference boxes, we want to use the Top attachment method as shown:
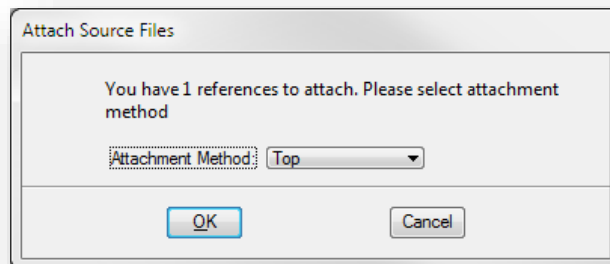


**Attach Source Files**

7. After accepting the attachment method, you will see an outline of the reference extents that you're trying to attach. Note that the attachment point is the center of the reference.
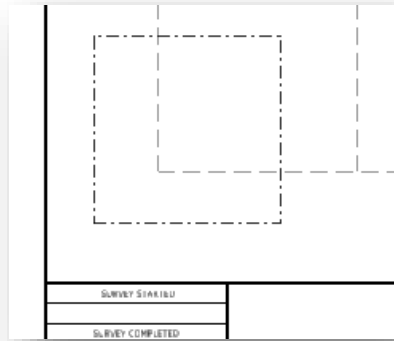
**Reference Attaching**

8. At this time, you need to position your cursor and snap to the appropriate grid location where you'd like to place the reference box. When satisfied with your location, place the reference by a left click.
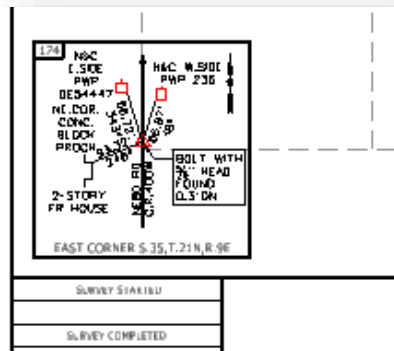


**Placed Reference Box**

9. Repeat steps 5-8 for each successive reference box. Finally, to disable the reference grid, disable the Constructions view attribute that we enabled in step 3.

### 6.4-7  Adding the Coordinate Table to the Route Plat

Next we need to add our Coordinate Table to our plat sheet.

1. If not open and active, open your route plat and make sure the plat sheet is open in MicroStation.
2. Make sure you've fit the entire sheet in your view. Do this by either performing a Fit View Zoom from the View toolbar or by double clicking your middle/mouse button.

**Fit View**

3. At this time, we want to open both the Models and References dialog boxes from our Primary Tools toolbar. They sit next to each other as shown.



**Models and References**

4. With both dialogs open, we can now drag our Overall Coordinate Table model from the models dialog and directly attach it to our Plat as a reference.
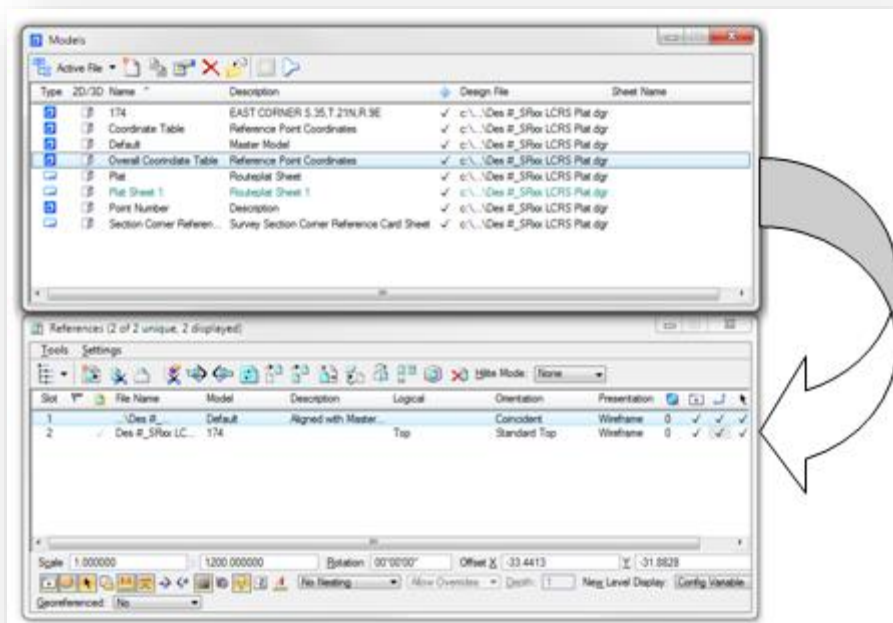


**Attaching the Overall Coordinate Table**

5. When prompted with the *Attach Source Files* dialog, set your attachment method to Coincident.
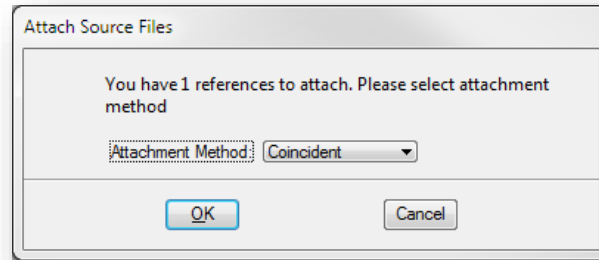
**Coincident Attachment**

6. This will attach the coordinate table to your routeplat sheet. You can adjust this reference placement by highlighting it on the Reference dialog and selecting the Move References tool and moving the reference as you would any other element.
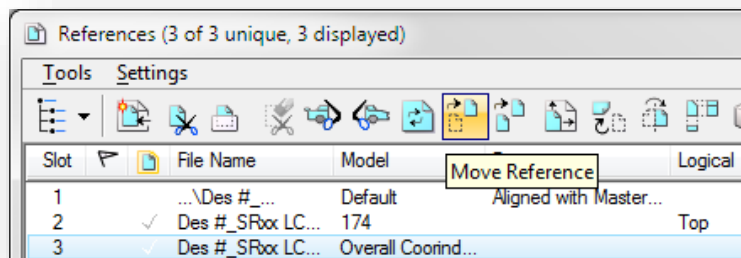


**Move References**

### 6.4-8   Creating Section Corner Cards

This section will walk you through the creation of Section Corner Cards and attaching the appropriate reference boxes.

1. Make sure your route plat file is open. At this time you do not need to be in a specific model.
2. Open the Models dialog. As we have done in previous examples, we'll be copying the template Section Corner Reference Card Sheet model as we did with both the reference boxes and the plat sheet.



**Accessing the Models Dialog**

3. With the models dialog open, highlight the Section Corner Reference Card Sheet model, then select the Copy Models button from the toolbar.
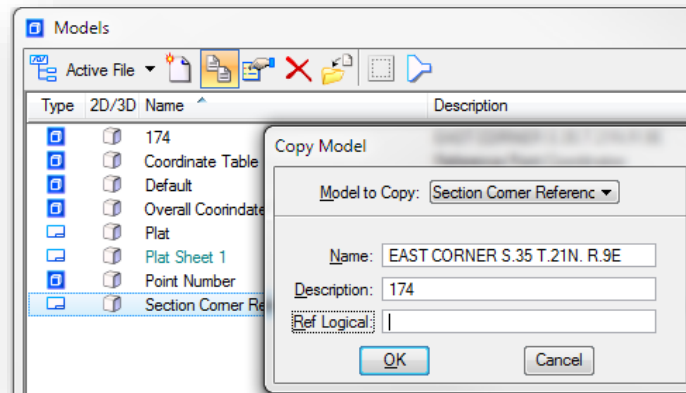
**Copying the Section Corner Reference**

4. In the Copy Model dialog, type the name and description of the reference card as shown in the previous illustration and hit OK. This will copy the model and should open it in the MicroStation session. If it doesn't open automatically, switch to it by double left clicking on the model in the Models dialog.



**Section Corner Card with Reference Box**

5. Open the references dialog from the Primary toolbar. You'll find that this model already has a reference back to the blank Point Number model in our active file. This is pre-attached to appropriately place the reference and allow you to quickly select the appropriate point number attachment.

6. In the reference dialog, double click on the reference with the Model named Point Number and when prompted, change the model on the Attachment Settings to the appropriate reference box as shown.
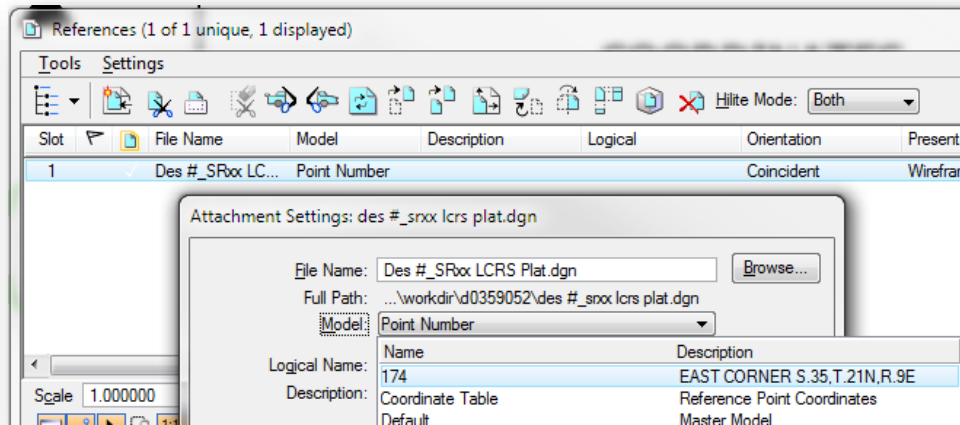
**Adjusting Reference Box Attachments**
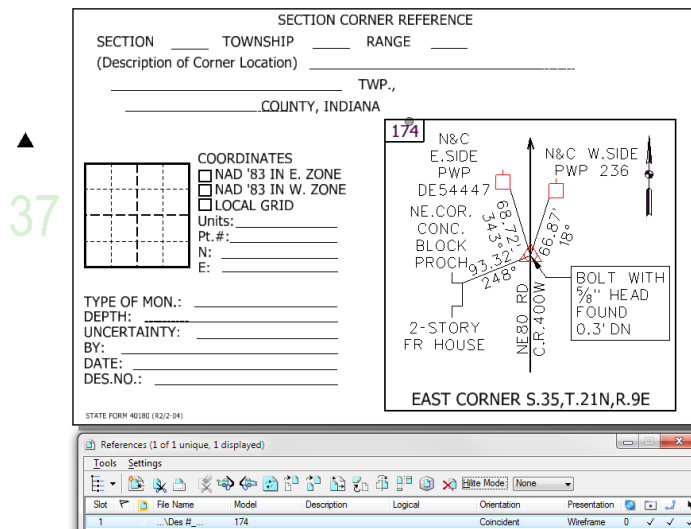

**Reference Box Attachment**

7.  At this time, you may conclude filling in the fields on the reference box and moving the section corner elements as needed.  To edit the text, use the Fill In Single Enter Data Field tool found on the task navigator under the Drawing task.
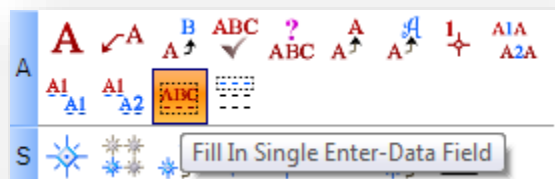

**Editing Section Corner Fields**

8.  Repeat the previous steps for each reference box as needed.

## 6.5    InRoads XIN Code Report

Within the InRoads environment, it's possible for each user to export a list of the survey codes from an InRoads report.  To do so, the following steps should be performed:

1. Start MicroStation and InRoads, any DGN will work as no items need drawn up.
2. On the InRoads Explorer, navigate to the *Tools -> View XML Reports....* Option.
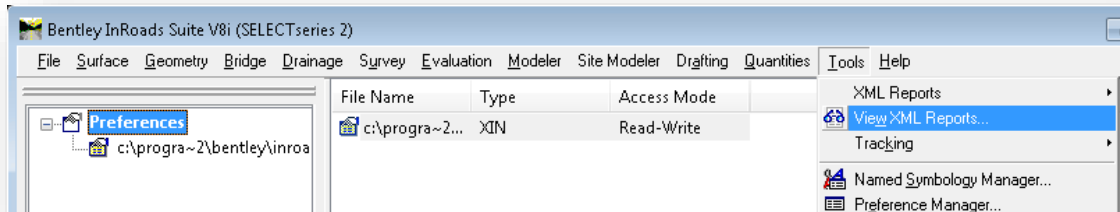


**View XML Reports**

3. With the Bentley Civil Report Browser open, go to the *File -> Open* option.
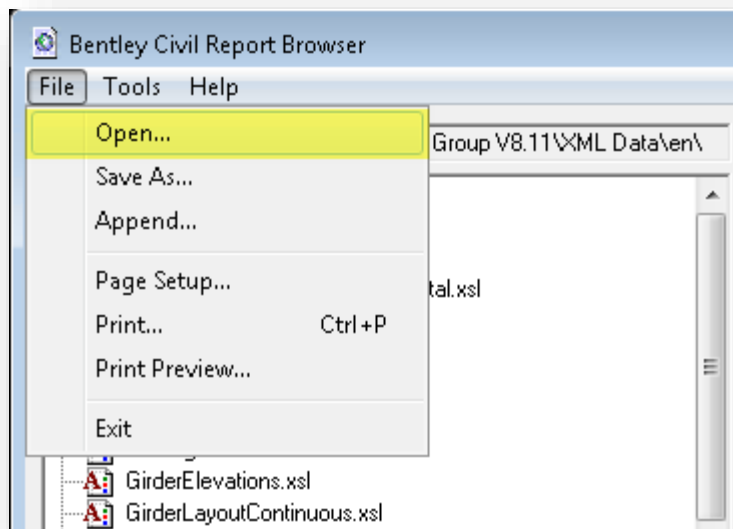


**Report Browser**

4. Navigate to the location of the Production XIN in ProjectWise.  This location is under Documents\INDOT Workspace\InRoads\XIN\INDOT.XIN.  *The Application dropdown will need changed to All Applications.*  Select *Open*.
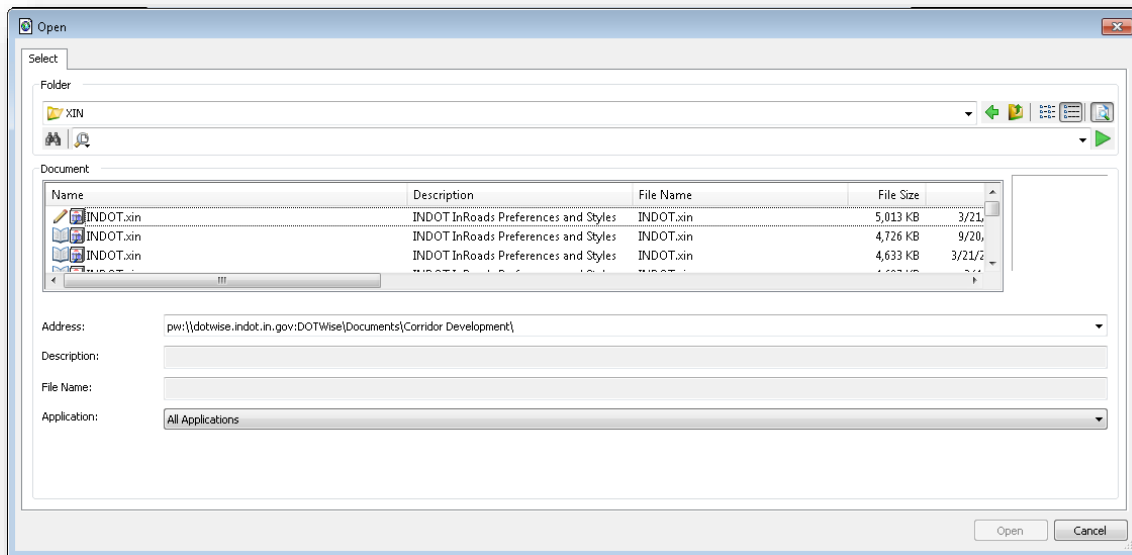


**Browsing for the Production XIN**

5. With the XIN now open in the Report Browser, select the XIN folder in the left panel, and expand it.  Under this folder, select the FeatureStyles.xsl report type.
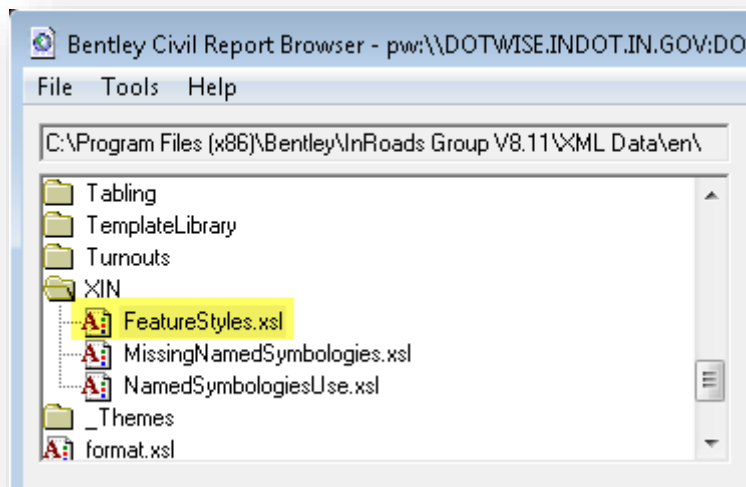


**The XIN Reports, and FeatureStyles.XSL**

6.  This will process the opened XIN through the appropriate report and will provide a list of all features and where applicable, the Survey Codes used.
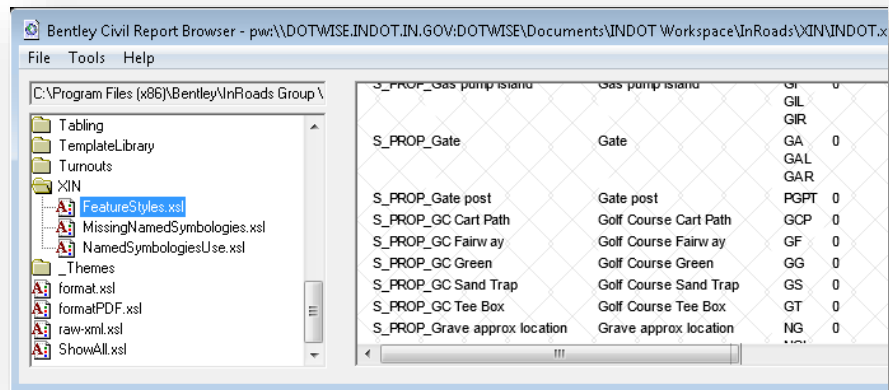


**XIN Report**

7.  With the XIN report open, there are a number of addition items that can be performed with the visible data. Of particular note is the ability to print, and export to a variety of formats. To export to a different format such as Excel, right click in the report and select Export to MicroSoft Excel. With the report in other formats, the data can be adjusted to fit specific needs.
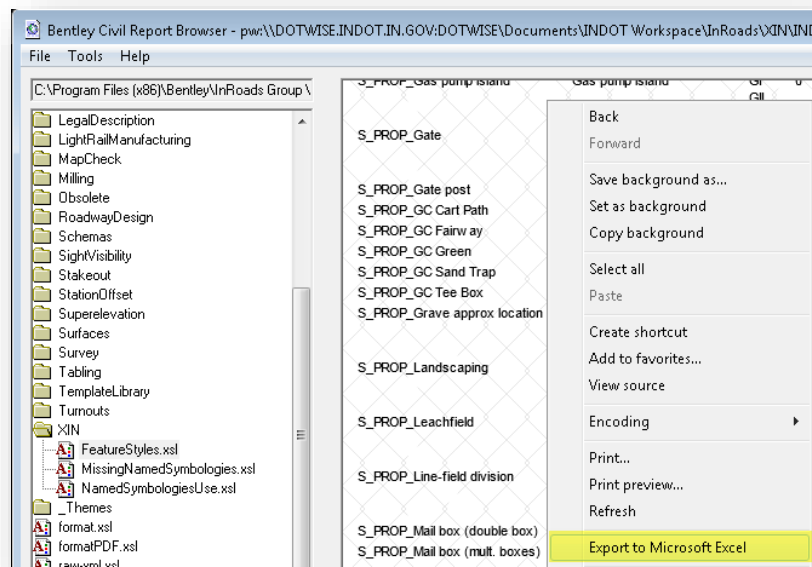


**Export to Excel**

## 7.    InRoads Plans Production for Design

The following sections discuss the usage of InRoads for INDOT Plans Production purposes.

### 7.1    Referenced Base Drawings

The base drawings listed above can be easily referenced together.  The only possible difficulty might be differences in coordinate systems between the files.  This may be resolved using MicroStation tools.  This problem is not likely unless you have drawings (MicroStation or AutoCAD) with information from sources outside of INDOT.  Despite this problem, it can be fixed.  The following figure displays how base drawings are placed together.

Base drawing **Explan 50**

Base drawing **Excont 50**

Base drawing **Prplan 50**
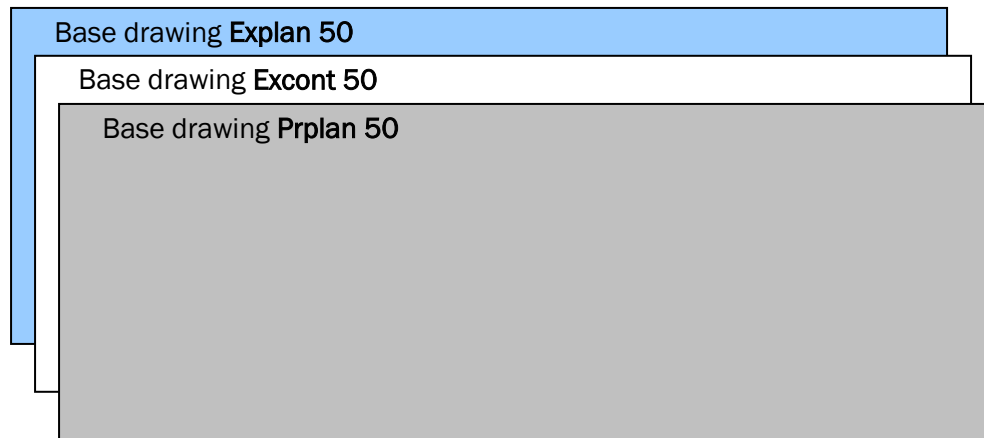
**Conceptual view of Base Drawings Referenced Together**

This figure displays a view with Prplan set as the active drawing and with both Explan and Excont drawings referenced into Prplan.  The actual results would look like the illustration below.
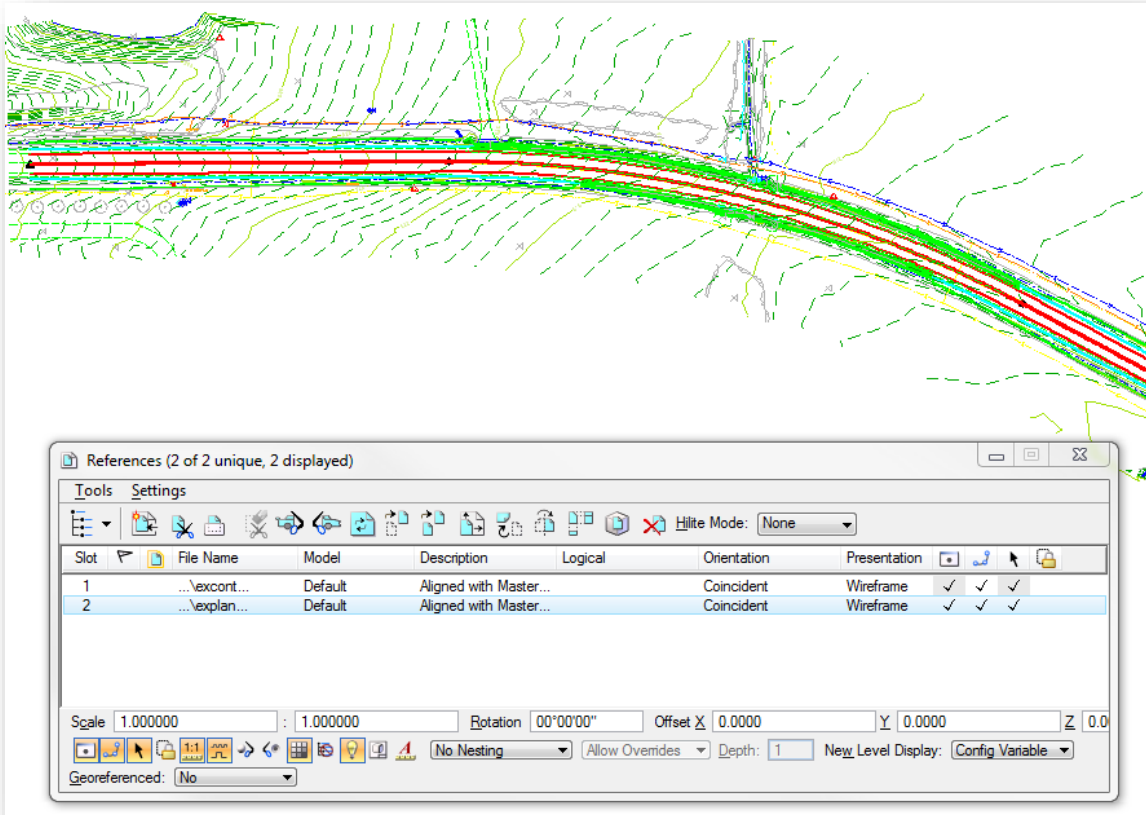
**Prplan 50 with Explan 50 & Excont 50 as references**

## 7.2      Reference Windows

The base drawings will have reference window views that show through to all of the base drawings. The tools contained in the Plan and Profile Generator are used to create plan profiles, bridge layouts, construction details, and other drawings.  The following figure displays how reference windows with multiple base drawings are placed together.
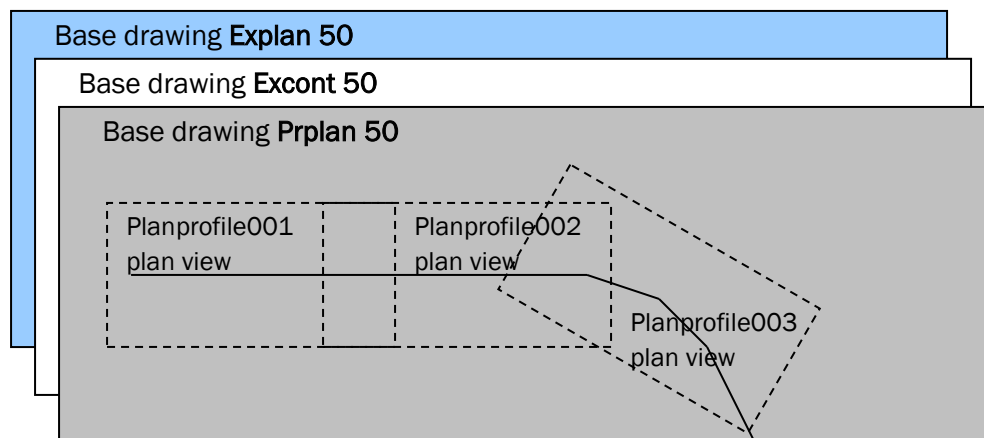
**Base Drawings Referenced Together with Reference Windows.**

The above figure displays a view with Prplan set as the active drawing and both Explan and Excont drawings referenced into Prplan.  The addition to the figure is how reference windows are included, which is accomplished by using the Plan and Profile Generator.

Each of the plan views represents a plan view area that is clipped into a given plan profile drawing. These same concepts apply to both plan and profile views.

Construction details, Bridge Layouts, and other drawings use the same principles for each type of drawing but with different view sizes and layouts for each.

InRoads will create saved drawings utilizing base drawings and then apply saved reference windows to each respectively based on the type of drawing and scale selected.

## 7.3      Text Drawings

A common CAD technique is the incorporation of text drawings.  Text drawings are CAD drawings that only contain text elements.  These text drawings facilitate drawing file organization and make plan set creation easier.  When these text drawings are referenced together with base drawings and other drawings, they form composite drawings representing finished sheets.  One major advantage of these drawings is that they eliminate problems with text orientation and overlap.  The problem is related to the two possible locations to place text annotation on a set of drawings, in the base drawings and in the sheet (text) drawings.  Annotation placed in the base drawings is usually oriented with North being up.  This causes annotation to be readable only from one orientation.  Text could be rotated for each window, but this does not fix problems occurring in overlapping plan areas. See the following figure.
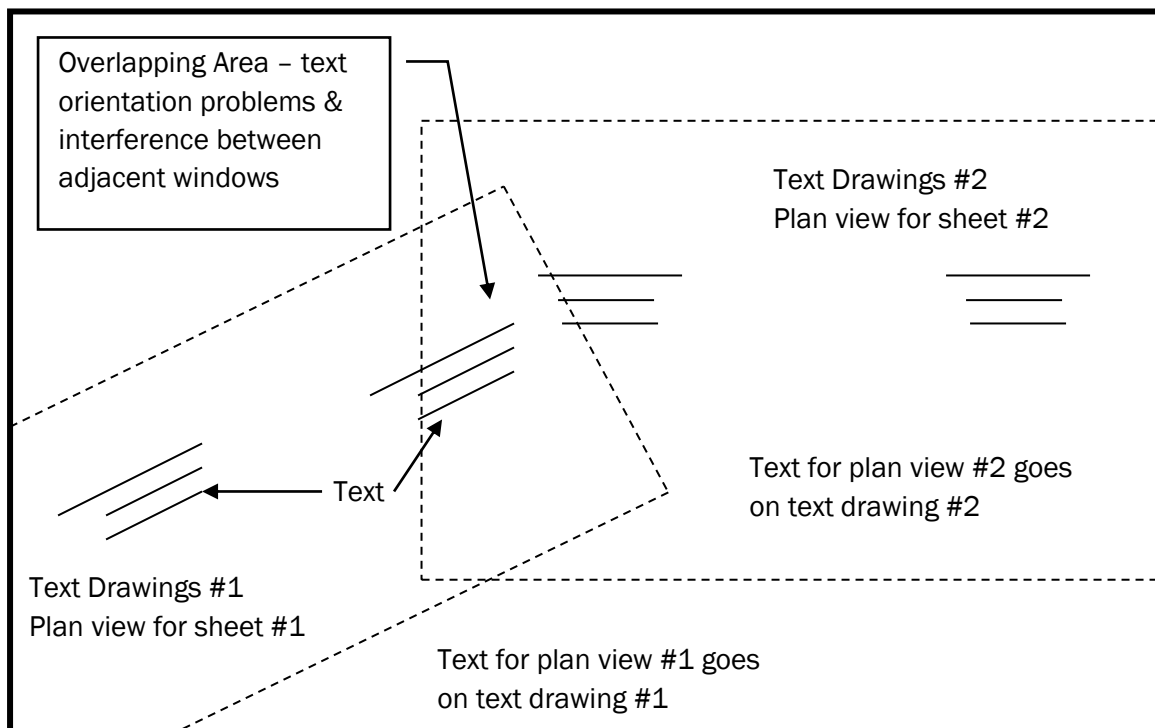
**Problem with Overlapping Text Area**

As seen in the above window, orientation of text in the overlap area is a problem. The preferred method for text placement is in the reference view text drawing. These reference view text drawings are the plan profile drawings, Bridge Layouts, construction detail, or other drawings. The practical result of this is each drawing is a text drawing with no line work drawn in it. For the most part, the only elements which reside in the sheet (text) drawings are text elements.

Please note editing done on text drawings in overlapping areas will not be reflected in adjacent areas without editing each adjacent sheet.

The InRoads Plan and Profile Generator automatically creates sheet text drawings for plan profiles, Layouts, Construction Details, and other InRoads created sheets. The saved plan profiles, Layouts, and Construction details are essentially composite drawings made up of references for border, existing topography, proposed design, etc. with reference windows clipped to match the size of the border. These saved sheets are ready to accept text and are text drawings.

It is also recommended that text drawings be used with cross section drawings. When used with cross sections they are created as blank drawings that will then have the border and cross section referenced in. This technique helps to preserve manual annotations on cross sections. Please note that these drawings will need created manually.

Annotations on the base drawings can be copied to each sheet. On each requisite sheet the annotations can be moved, modified, and rotated as needed. In order to prevent duplicate text coming from the base drawings, annotations can be changed to construction elements with the change element attributes tool in the base drawing. Constructions can then be turned off in each text drawing while they will remain in the base drawings. Use of save settings is important with these operations. This will allow the sheet drawings to have construction elements turned off, prohibiting duplication.

## 7.4 Creating Base Drawings

For the following procedures, it is assumed that the end user already has opened their surfaces and alignments as needed.

### 7.4-1 Creating the Existing Plan Drawing

*Note: The following exercises are based upon a production drawing example.*

Use *MicroStation -> File -> New* to *create* the drawing *Explan 50.*

This will create and open a .dgn with this name in the folder you specify in the New Document dialog.

**The New Document, No Wizard dialog**

Click OK – a blank drawing is opened, and a new MicroStation/InRoads drawing is created.

Remember any projects that fall under Section 5.1-6 will have their geo-coordinated seed file provided as part of the survey deliverables.

Additionally, you may create these base drawings externally of MicroStation/InRoads using the document creation wizards and tools in ProjectWise as discussed in Section 5.2-1c.

Make sure your TOPO surface is your active surface in the InRoads Explorer; you can do this by highlighting the relevant surface and right clicking on it.  When prompted, select *Set Active* as shown in the following illustration:

**Activating a Surface**

When active, the surface icon will be shown with a red box around it.

Once activated, you will then need to define your global display factors. At this time, go to *InRoads Explorer -> Tools -> Global Scale Factors* and set the scale appropriately for your base drawing. The following illustration shows the values necessary for a 50 scale drawing:



**Global Scale Factors**

To display the TOPO features, you will then need to display the features. You can do this by going to the *InRoads Explorer -> Surface -> View Surface -> Features...* menu item. You will then be provided the following dialog:
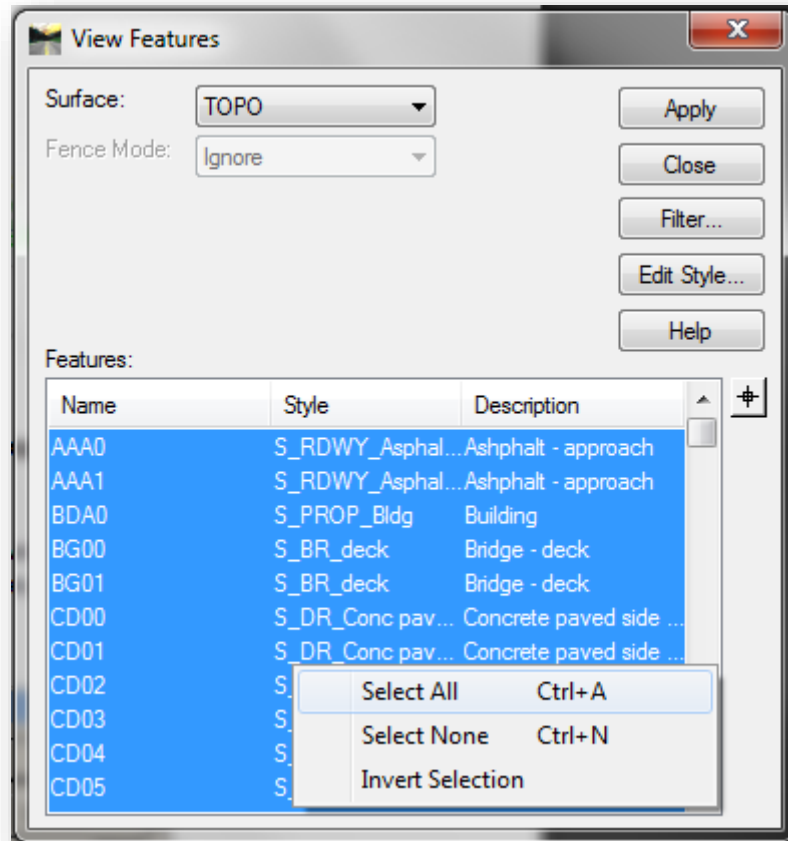
**View Features Dialog**

Like the majority of the surface tools, this list is filterable and allows for the selection of All, None or an Inverted selection set from directly within the dialog. For the TOPO, select all features and select Apply, which will have InRoads display the topographical features in your DGN. You may need to do a fit view command to see the elements drawn.

*CAD Menu -> File -> Save Settings* at this point to retain the information, additionally, you may use the Ctrl+F hotkey combination.

*Optional Steps:*

This process could be repeated for *1"=20' and 1"=100'*. These scales are anticipated to be utilized in some plan sets.
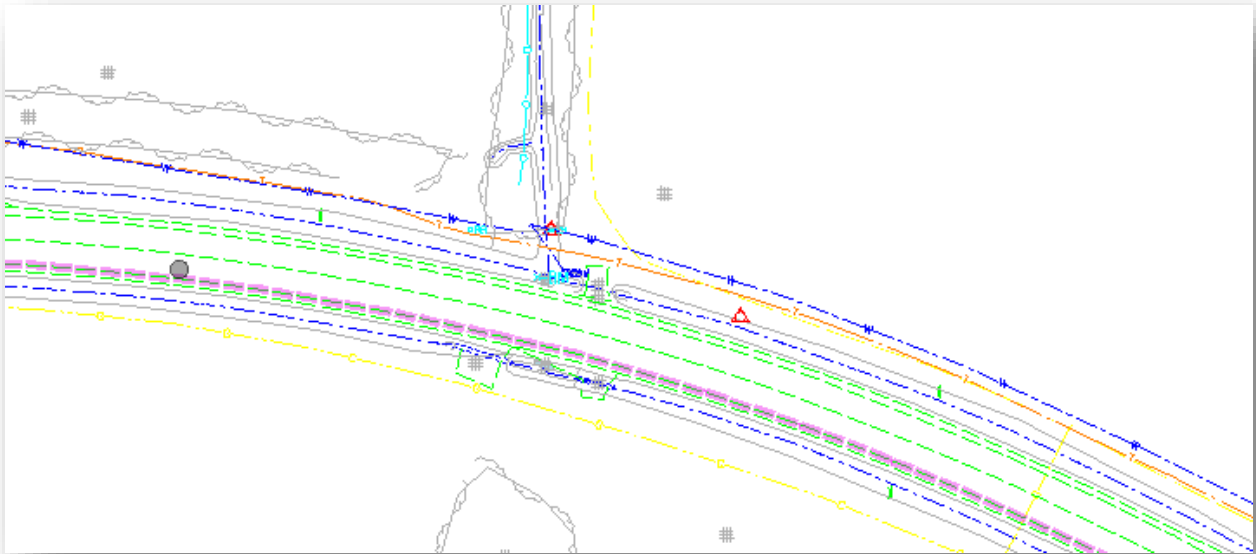
**Topo surface as displayed in Explan 50**

### 7.4-2    Creating the Existing Contour Drawing

Use *MicroStation -> File -> New* to *create* the drawing *Excont 50.*

This will create and open a .dgn with this name in the folder you specify in the New Document dialog.



**The New Document, No Wizard dialog**

Click OK – a blank drawing is opened, and a new MicroStation/InRoads drawing is created.

Remember any projects that fall under Section 5.1-6 will have their geo-coordinated seed file provided as part of the survey deliverables.

Additionally, you may create these base drawings externally of MicroStation/InRoads using the document creation wizards and tools in ProjectWise as discussed in Section 5.2-1c.

Make sure your TOPO surface is your active surface in the InRoads Explorer; you can do this by highlighting the relevant surface and right clicking on it.  When prompted, select *Set Active* as shown in the following illustration:



**Activating a Surface**

When active, the surface icon will be shown with a red box around it.

Once activated, you will then need to define your global display factors.  At this time, go to *InRoads Explorer -> Tools -> Global Scale Factors* and set the scale appropriately for your base drawing.  The following illustration shows the values necessary for a 50 scale drawing:

At this time, you can display the contours.  To access this tool, go to the *InRoads Explorer -> Surface -> View Surface -> Contours...* menu item.  You will then be presented the following dialog:
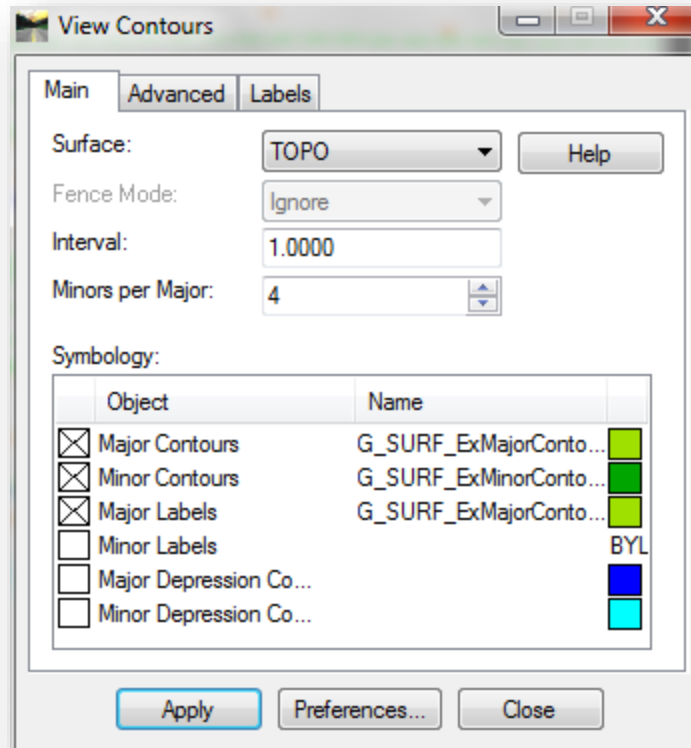


View Contours Dialog

To display the existing contours, you will first need to verify that you're using the preference for *IN Existing Contours*.  On the view contours dialog, select the Preferences... button.  This will display the Preferences for the view contours tools.  On this panel, you will need to select IN Existing Contours and select Load.  You will be given notification at the bottom of the panel that the preference has been loaded and is now set.  This is shown in the following illustration:
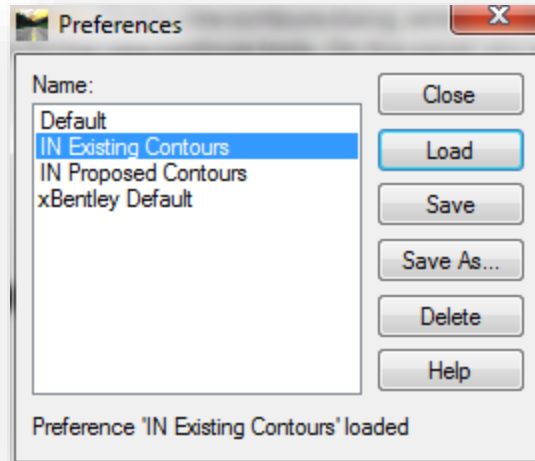
**Selecting and Loading IN Existing Contours Preference**

Once loaded, you can close the preferences dialog. On the View Contours dialog, you can then select Apply and close. Your existing contours will then be displayed in the DGN.

Depending on the stage of your project (most likely during the design phase) and the operations you may have recently performed, you may be prompted with the following dialog:
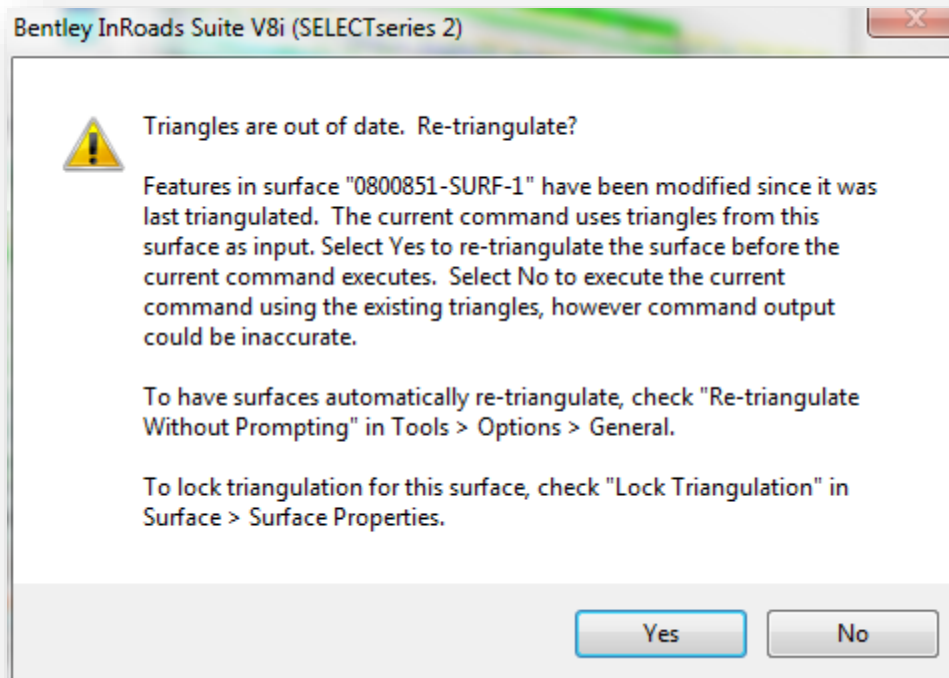


**Triangulation Notification**

This dialog is an alert that you're triangulation is no longer up to date. As the warning notes, you can continue your current operation without updating the triangles. This will use the existing triangulation which may be out of date and provide in-accurate information. Note that this warning can be triggered by any surface function that is attempting to use the triangulation to display graphics.

*Optional Steps:*

This process could be repeated for *1"=20' and 1"=100'*. These scales are anticipated to be utilized in some plan sets.
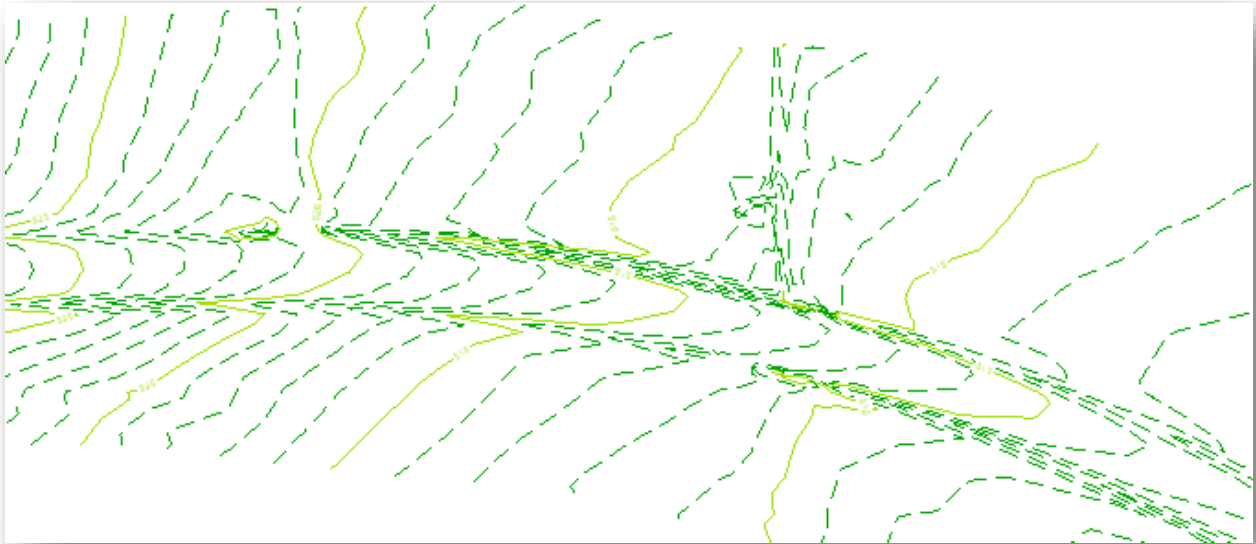


Contours as displayed in Excont 50

At this point, it is desirable to add any other base drawings in the same manner as used for *Explan* and *Excont*. These could include proposed contours (*Prcont*), existing right of way (*RW existing*), or any other drawing needed.

*Not all of these drawings will need to be referenced into the Prplan base drawing prior to creating any sheets (plan profiles, layouts, construction details, etc). All that is required is an alignment to orient the sheets.*

Next you will create the proposed plan drawing *Prplan*.

### 7.4-3 Creating the Proposed Plan Drawing

Use *MicroStation -> File -> New* to *create* the drawing *Prplan 50.*

This will create and open a .dgn with this name in the folder you specify in the New Document dialog.

**The New Document, No Wizard dialog**

Click OK – a blank drawing is opened, and a new MicroStation/InRoads drawing is created.

Remember any projects that fall under Section 5.1-6 will have their geo-coordinated seed file provided as part of the survey deliverables.

Additionally, you may create these base drawings externally of MicroStation/InRoads using the document creation wizards and tools in ProjectWise as discussed in Section 5.2-1c.

Make sure your proposed design surface is your active surface in the InRoads Explorer; you can do this by highlighting the relevant surface and right clicking on it.  When prompted, select *Set Active* as shown in the following illustration:

**Activating a Surface**

When active, the surface icon will be shown with a red box around it.

Once activated, you will then need to define your global display factors. At this time, go to *InRoads Explorer -> Tools -> Global Scale Factors* and set the scale appropriately for your base drawing. The following illustration shows the values necessary for a 50 scale drawing:
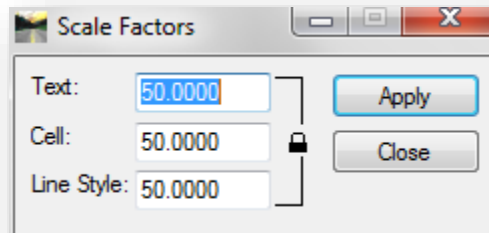


**Global Scale Factors**

To display the DES features, you will then need to display the features. You can do this by going to the *InRoads Explorer -> Surface -> View Surface -> Features...* menu item. You will then be provided the following dialog:
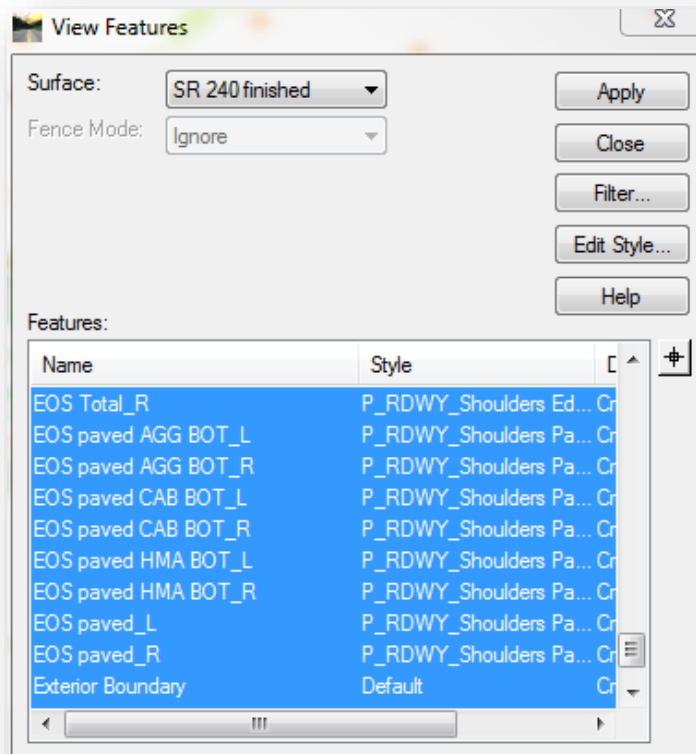
**View Features Dialog**

Like the majority of the surface tools, this list is filterable and allows for the selection of All, None or an Inverted selection set from directly within the dialog.  For the DES, select all features and select Apply, which will have InRoads display the proposed features in your DGN.  You may need to do a fit view command to see the elements drawn.

*CAD Menu -> File -> Save Settings* at this point to retain the information, additionally, you may use the Ctrl+F hotkey combination.



**PRPLAN model as displayed in Prplan 50**

*7.4-3a      Displaying Alignments*

Since InRoads requires you to use alignments to layout sheets and display annotation, you will display each alignment.  Also, you want to have sheets laid out beyond the project limits to show incidental construction limits and some of the existing survey beyond.  Differing from MX however, is the ability of the Roadway Modeler to allow templates to cover specific station ranges, making the need for shortened alignments unnecessary.

To display the alignments, you can perform 1 of 3 methods.  The first is quick display of all horizontal alignments via the InRoads Explorer.

To display the alignments in this fashion, right click on the name of your geometry project on the InRoads Explorer's Geometry tab and select *View All Horizontals* as shown:
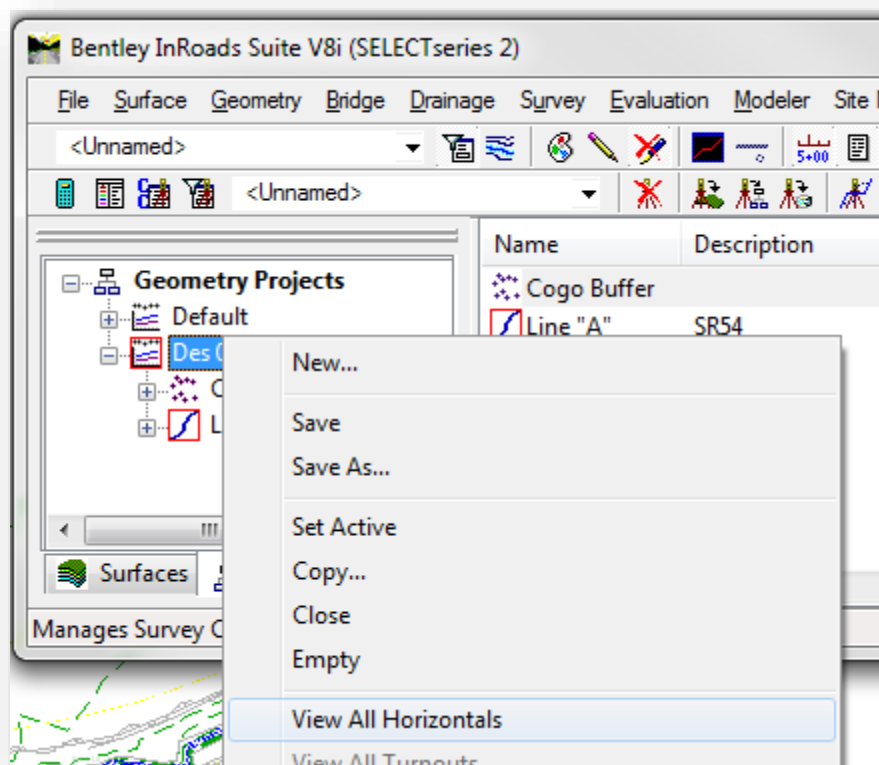


**View All Horizontal Alignments**

This will have InRoads display all horizontal alignments defined in your geometry project.

The next method is displaying a single horizontal alignment from the InRoads Explorer.  As in the previous example, you will need to browse to the Geometry tab and expand your project so it shows the horizontal alignment you'd like to display.  You will then right click on the alignment and select *View* as shown:
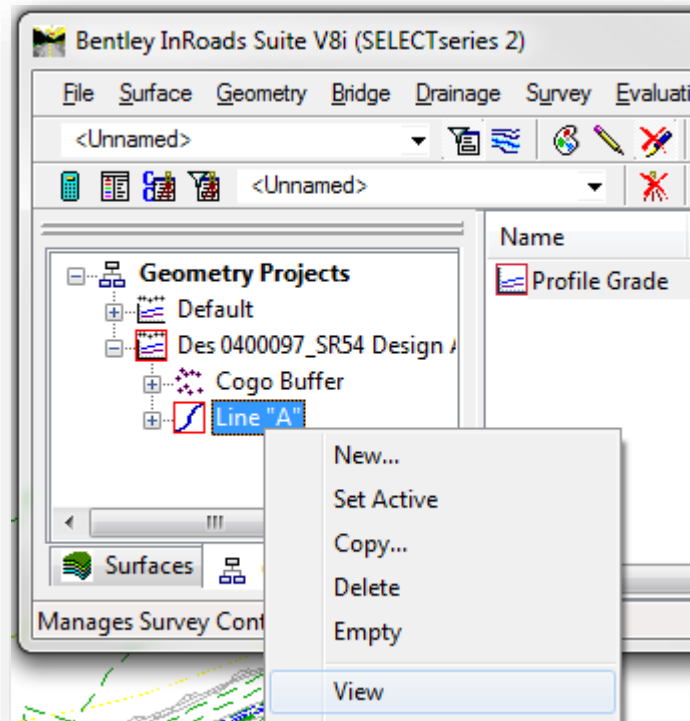
**Viewing a Single Horizontal Alignment**

This will display only the selected horizontal alignment in your DGN.

The final method is displaying the active horizontal alignment from the InRoads Explorer -> Geometry -> View Active Horizontal menu item.
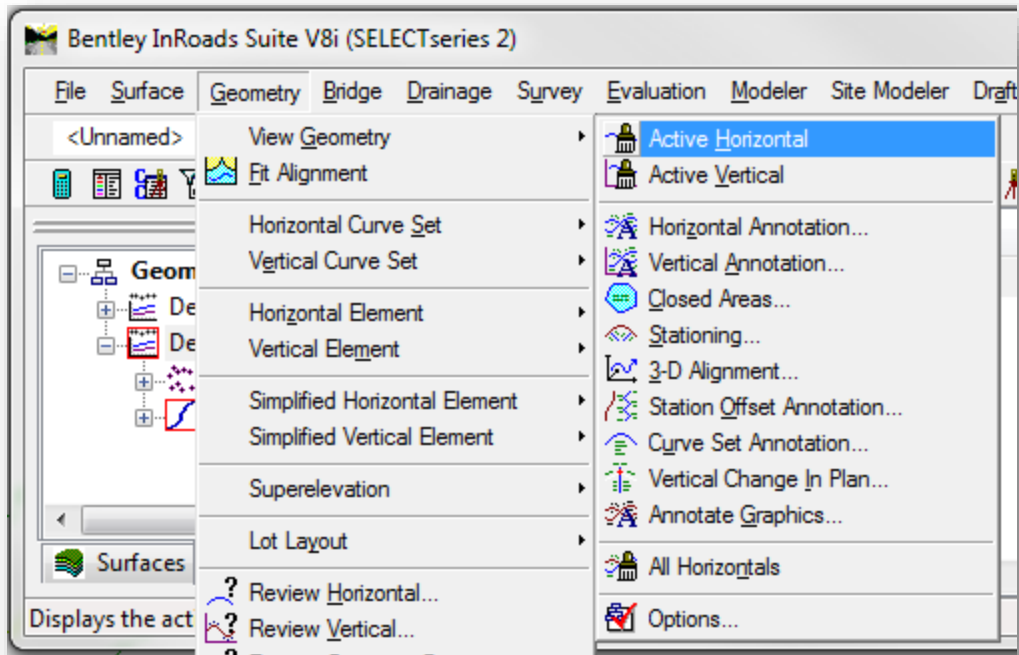
**View Active Horizontal**

This will display the currently active InRoads horizontal alignment in your DGN.

You will now reference the Explan 50, Excont 50, and any other base drawings into Prplan 50.

### 7.4-4    Attaching Explan as a Reference File to Prplan

Since you will be using MicroStation commands for these procedures, you will look at the ProjectWise specific method of attaching files.  Due to functionality differences with ProjectWise and MicroStation, the previous method of drag and drop attachment will not work from within ProjectWise.

To attach your files, select *File ->Reference* from the MicroStation menu.
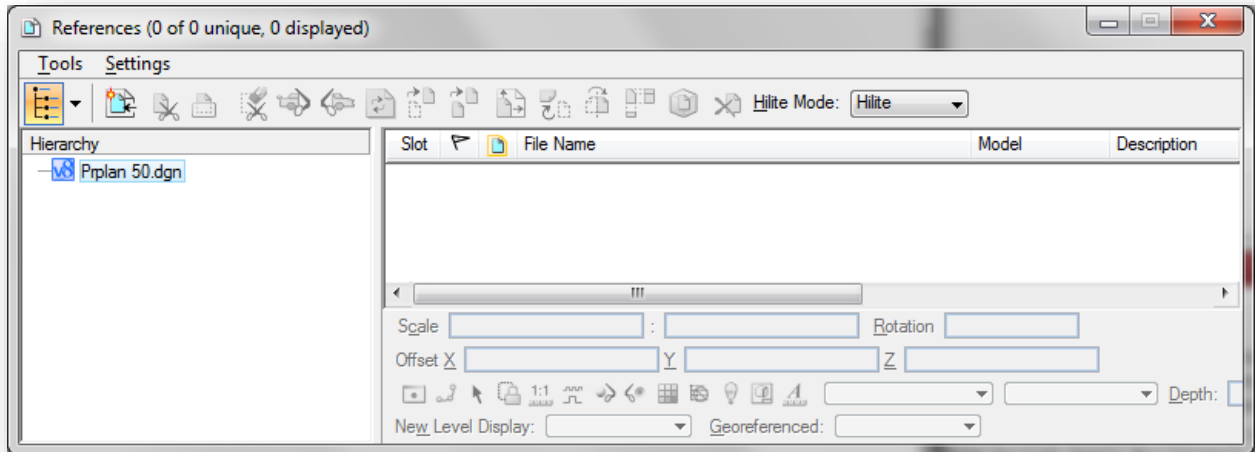
**The References Dialog**
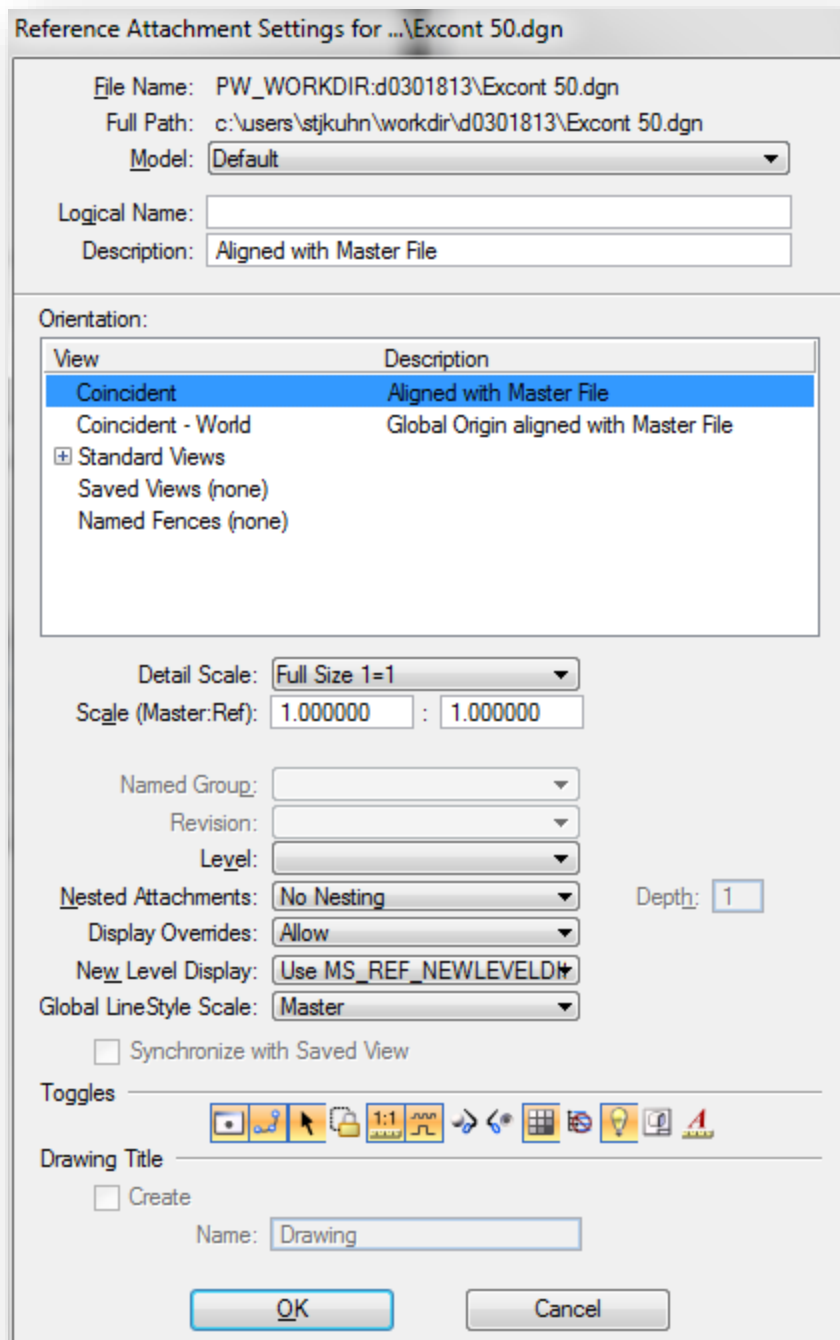
From the References dialog, select *Tools -> Attach...*
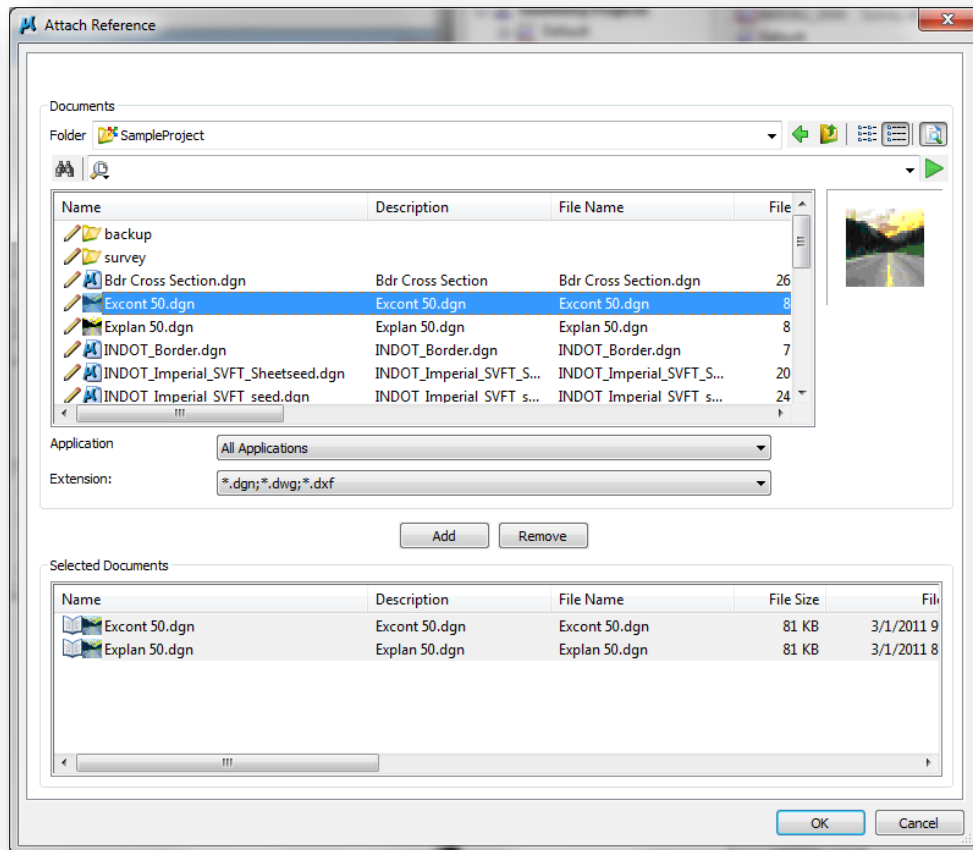


**The ProjectWise Attach Reference Dialog**

From the *Attach Reference* dialog, you can select multiple files to attach and add them to the *Selected Documents* section for attachment at the same time.  Once you have the documents you'd like to attach selected, select the OK button.

You will then be presented the Reference Attachment Settings window as shown:



**The Reference Attachment Settings Dialog**

The settings shown on this example are the ones you will want to use. Since you're no longer using Annotation Scale, the Global Linestyle Scale adjustments are no longer need. Coincident attachment will orient the files one directly over the other, and finally, the scale will be 1:1 as all elements should be full size at this time.

You will be presented this dialog for each of the files that you will be attaching to your file.

Suggested logical names and descriptions are indicated in **Appendix A** in the section on MicroStation Drawing Names under Standard Base Drawings. Variations on logical name and descriptions can be required at the user's discretion based on non standard project data. Once attached, you may modify the attachment's logical name by double left-clicking on the attachment and modifying its attachment settings.

Explan 50.dgn appears in the References panel. Another option available is the display can be turned on and off using the Display check box.



Display Check Box
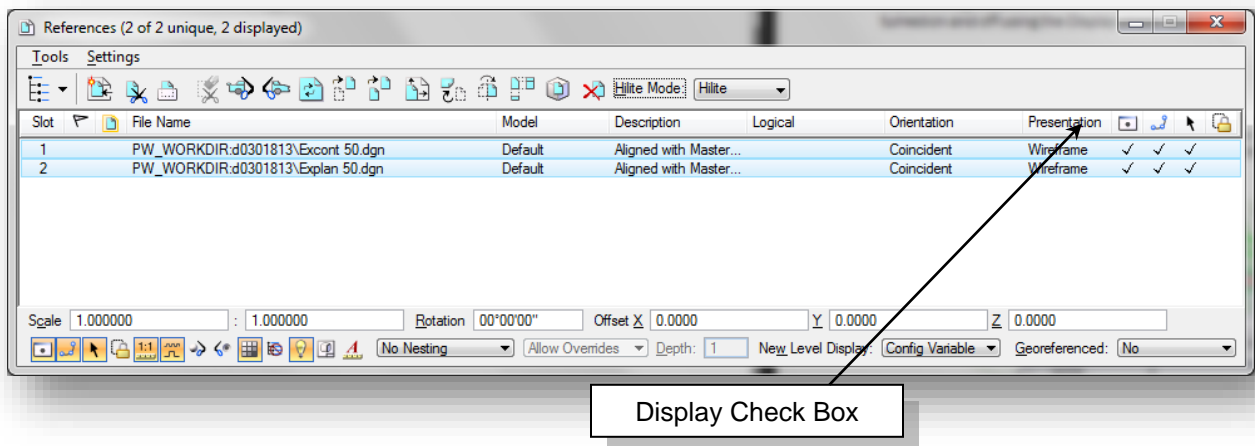
**Reference Dialog with References Attached**

The results should look like this.
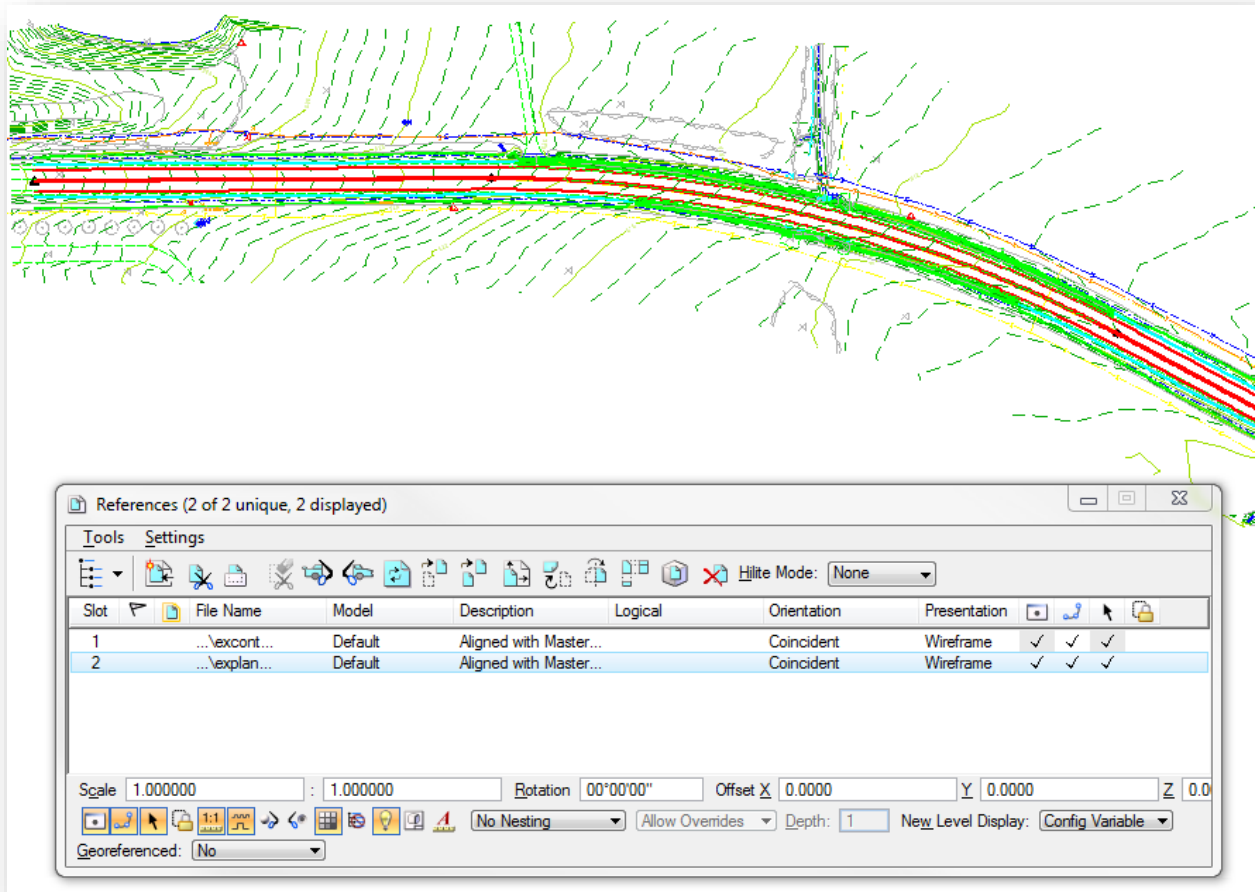
Prplan 50 with reference files Explan 50 and Excont 50 displayed

*Optional Steps:*

This process could be repeated for *1"=20' and 1"=100'*.  These scales are anticipated to be utilized in some plan sets.

Repeat the above procedure for each base drawing created.

### 7.4-5   Adding the Proposed Profile to the Prplan Base Drawing

With the switch to InRoads, there are a new set of procedures required to create and display your profiles in your DGN.  The tools you'll be using in this section are on the InRoads Explorer menu under *Evaluation -> Profile and Geometry -> View Geometry* and *Evaluation -> Profile -> Create Profile.*

Unlike MX, it's not required to have a profile displayed in order to begin the plan profile sheet creation process.  The process for creating a profile during the sheet creation process will be discussed later in this document.  This section will investigate the methods to create and view a profile for the purposes of creating/editing proposed profiles.

First, you need to adjust the symbology display for our surface so it displays properly in profile view. To do this, right click on your Survey Surface and select Properties.
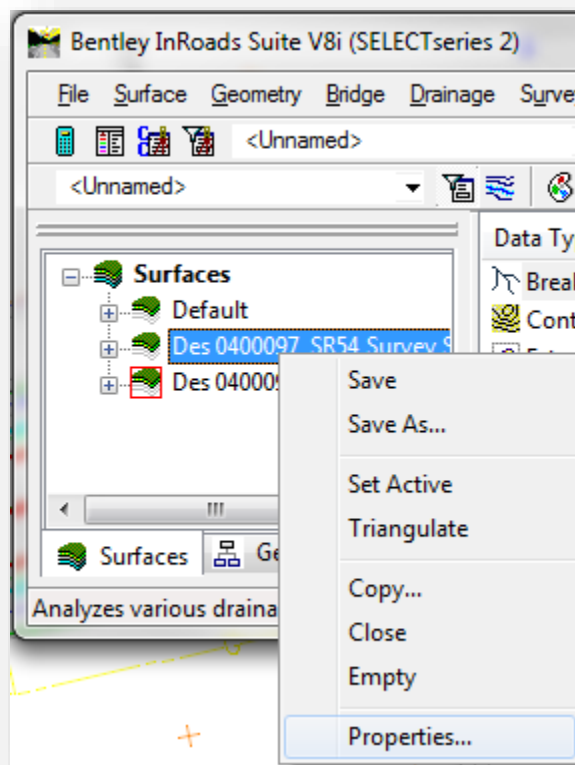


Surface Properties

This will give you the Surface Properties dialog; in particular, you want to look at the Advanced tab. At this time, you're concerned with the Profiles portion of t he dialog.  Shown in the following illustration, you can see that the Survey Surface has been set to PROF_E_Ground_Profile.
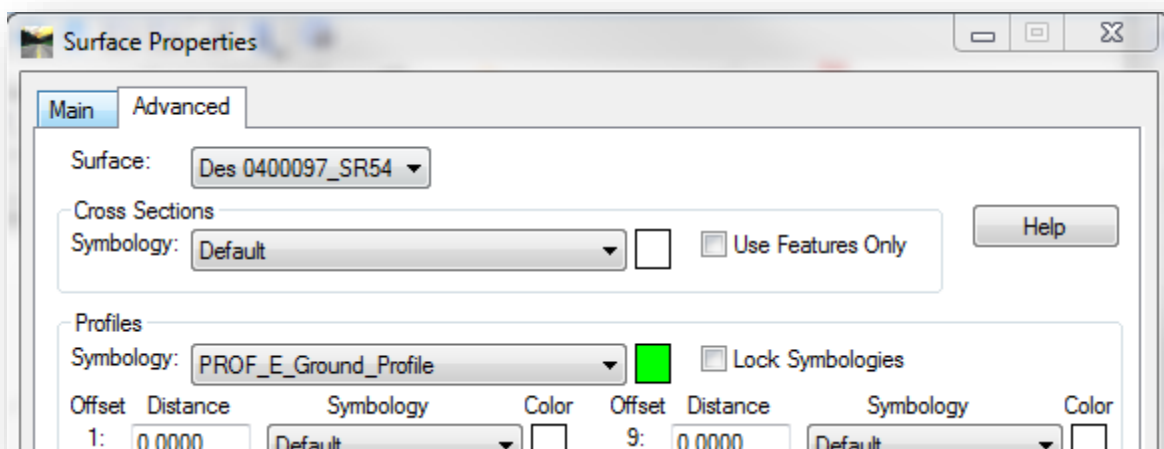
## Profile Symbology

With this set, you can apply this to your surface. Note that your surface will need to be editable for this to be saved.

Next is the creation of the profile. For this, access the profile creation tools through the *Evaluation -> Profile -> Create Profile* menu item. This will start the Create Profile dialog as shown below:
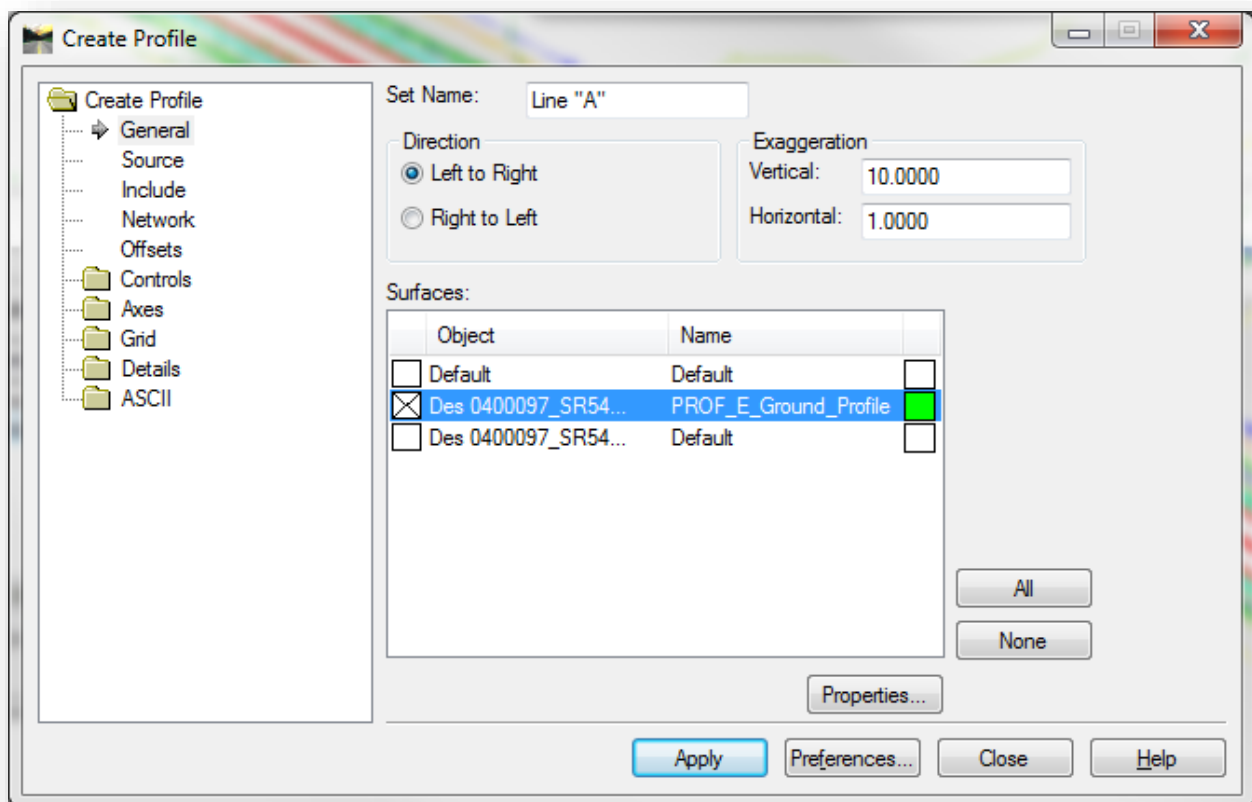


Create Profiles dialog/General Tab

On this dialog you can control all features related to how a profile looks when completed. Like other InRoads functions, there are INDOT customized preferences available to draw up your profile, adhering to agency standards.

For the purposes of this review, you'll only examine the tabs that must be configured when using one of the INDOT preferences, first, the General tab.

Shown above, the General tab controls profile direction, included surfaces, and exaggeration. As with MX, one must select the appropriate TOPO surface so that it displays appropriately along with setting the scale appropriate exaggeration.

The Source tab shown below, is where one inputs the alignment they would like their profile cut along.
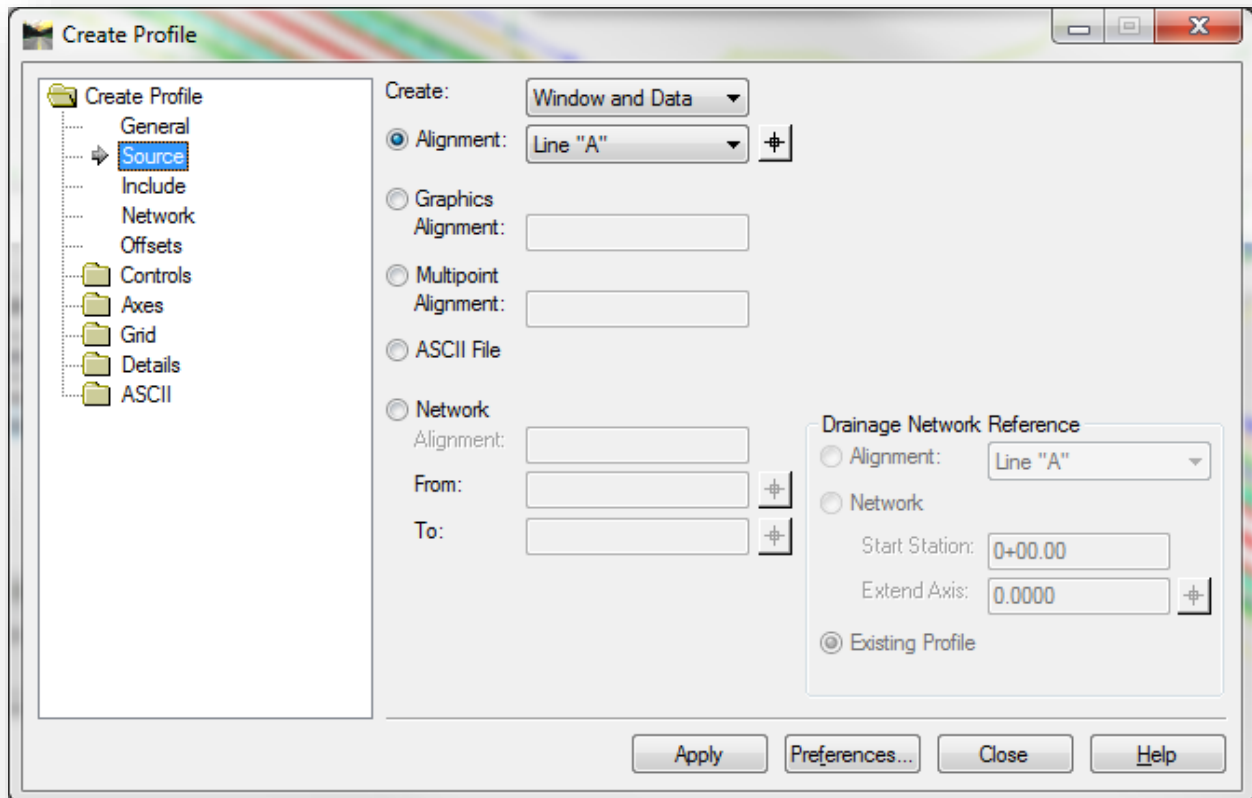
Source Tab

One needs to define the Horizontal Alignment that is being used in this instance. In addition to this functionality, one can define graphical elements, interactive point selections, ASCII text, and drainage networks to create a profile along.

These are the required items for creating profiles. In addition to the existing surface profile, the additional tabs provide functionality to include crossing and project features, drainage features, etc. Many of these tabs also have settings for scaling, sizing, and symbology for the various profile elements, many of which have default values provided by the preferences.

Once satisfied with the profile settings select Apply and place the profile following the input prompts for placement.

### 7.4-6 Adding the Proposed Vertical Alignment

With the profile now displayed, you can add proposed vertical alignments. Should you be creating a new vertical alignment, you will need to use the tools under the *Geometry* menu using the *Vertical Element* and *Vertical Curve Set* tools.

To add a proposed vertical alignment to an existing profile, one can use the *Geometry -> View Geometry -> Active Horizontal* menu item. Alternatively, as long as the existing profile is drawn up,

one can right click on the desired vertical alignment and select *View.* This will display the selected vertical alignment on the existing profile.

## 7.5 Sheet Layout and Creation (Plan Profile Sheets)

The following section discusses the various functions included in the Plan and Profile Generator. This will include reviewing some of the differences between creating a profile using the previously discussed method, and how Plan and Profile Generator will create its own for use during the sheet cutting process. For further reference on this tool and its functionality, please refer to the Bentley InRoads Plans Production course via the Bentley Learn Network.

### 7.5-1 Plan and Profile Generator

While in the prplan.dgn, open the Plan and Profile Generator from the *Drafting -> Plan and Profile Generator* as shown in the following illustration:
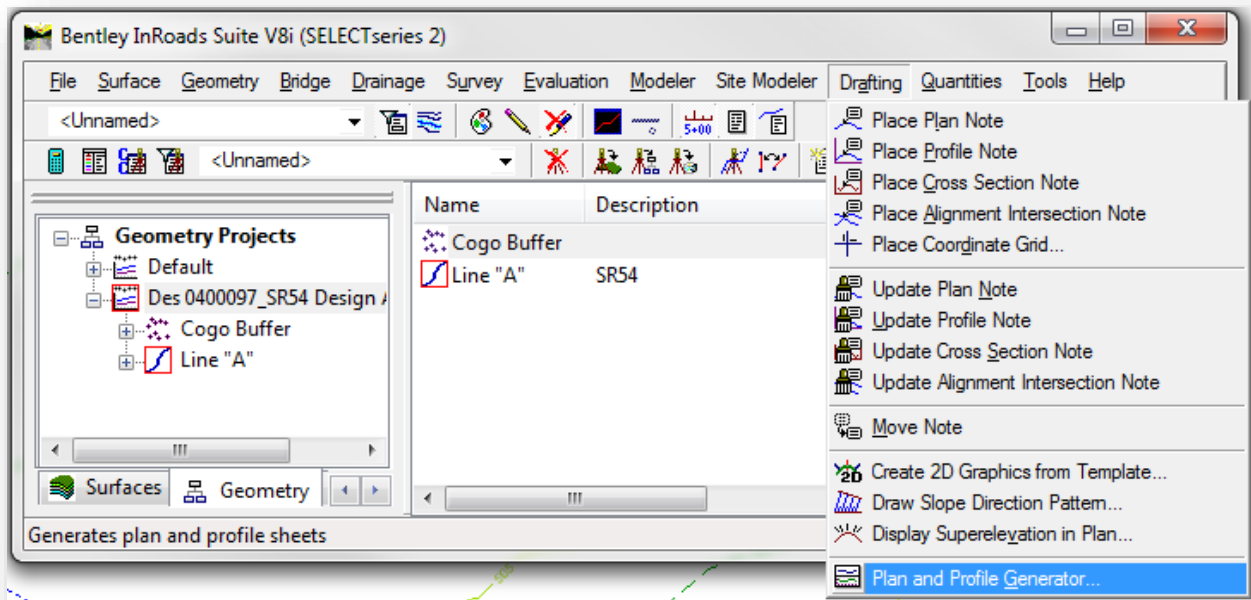


Plan and Profile Generator

This will present the Plan and Profile Generator window. With the sheer number of options available in this tool, it is highly advised that one use the preferences that are provided. These correspond to the INDOT standard sheets. As there are numerous preferences available, please refer to the table on the next page for a listing of the preferences and their function. For all preferences listed as IN PW, please note that these are configured to attach the appropriate border from within the ProjectWise system.

| Default | Default Preference, settings are configured the same as IN PW Plan Profile 50 Scale |
|---|---|
| IN PW Bridge Layout XX Scale | INDOT Bridge Layout sheet, available in 30 and 50 scales |
| IN PW Dbl Plan XX Scale | INDOT Double Plan sheet, available in 10, 20, 30, 50, and 100 scales |
| IN PW Plan XX Scale | INDOT Plan only sheet, available in 10, 20, 30, 50, and 100 scales |
| IN PW Plan Profile XX Scale | INDOT Plan Profile sheet, available in 20, 30, 50, and 100 scales |
| INPWPlanProfileXXScaleLargePlan | INDOT Plan Profile sheet, available in 20, 30, 50, and 100 scales |
| xBentley Default | Original, as shipped Bentley Default preference |

To illustrate the most extensive sheet cutting path, you will review the process for cutting a 50 scale Plan Profile sheet.

### 7.5-2   Sheet Creation

Like numerous other InRoads tools, Plan and Profile Generator defaults to using the active geometry project and subsequent horizontal and vertical alignments.  One can either pre-activate each alignment prior to opening the tool, or they can interactively select these items from within the Plan and Profile Generator.

*Note:  The various text and symbology functions within the Plan and Profile Generator all respect the values in the Global Scale Factors add-in.  For the correct display of these elements, make sure that Global Scale Factors are consistent with the scale sheet being cut.*

When first starting the tool, the following window will be displayed:

**Plan and Profile Generator**

| Border and Title | Symbols and Details | Match Lines | Sheet Index |
|---|---|---|---|

| Main | Plan Controls | Profile Controls | Sheet Layout | View Layout |
|---|---|---|---|---|

**Method**
- ○ Plan Only
- ◉ Plan and Profile
- ○ Profile Only

**Plan Views**
- ○ Use Plan Views
- ◉ Use Station Limits

**Profile Views**
- ○ Use Profile Views
- ◉ Use Station Limits

**Sheets**
- ☑ Generate Sheets
  - ○ VDF Information Only
  - ◉ VDF Information and Host Files

Horizontal Alignment:

Line "A"    [Edit...]

Geometry Projects in this VDF:

[Help]

Note: Unless otherwise noted, all measurements for this command are in model units.

**Station Limits**

|  |  | Default |
|---|---|---|
| Start: | 10+00.00 | 10+00.00 |
| Stop: | 28+60.00 | 28+60.00 |
| Length: | 1500.0000 | |

Plan Views:                Total: 0

| In... | Name | Start | Stop |
|---|---|---|---|

Profile Views:                Total: 0

| Name | Start | Stop |
|---|---|---|

[Apply]   [Preferences...]   [Close]

**Plan and Profile Generator Main Tab**

With this tab displayed, you'll start by loading the appropriate preference for a 50 scale plan profile sheet.
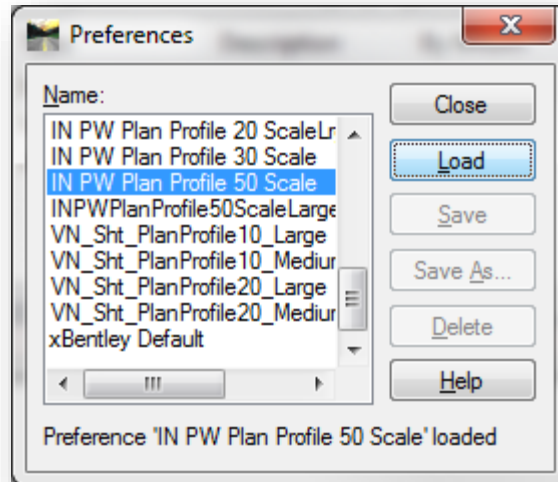
**Loading IN PW Plan Profile 50 Scale**

With the preference loaded, you can now start reviewing the options that are loaded for an INDOT specific sheet. For specific information on each of these settings, please refer to the online help in the software, or the InRoads Plans Production course guide.
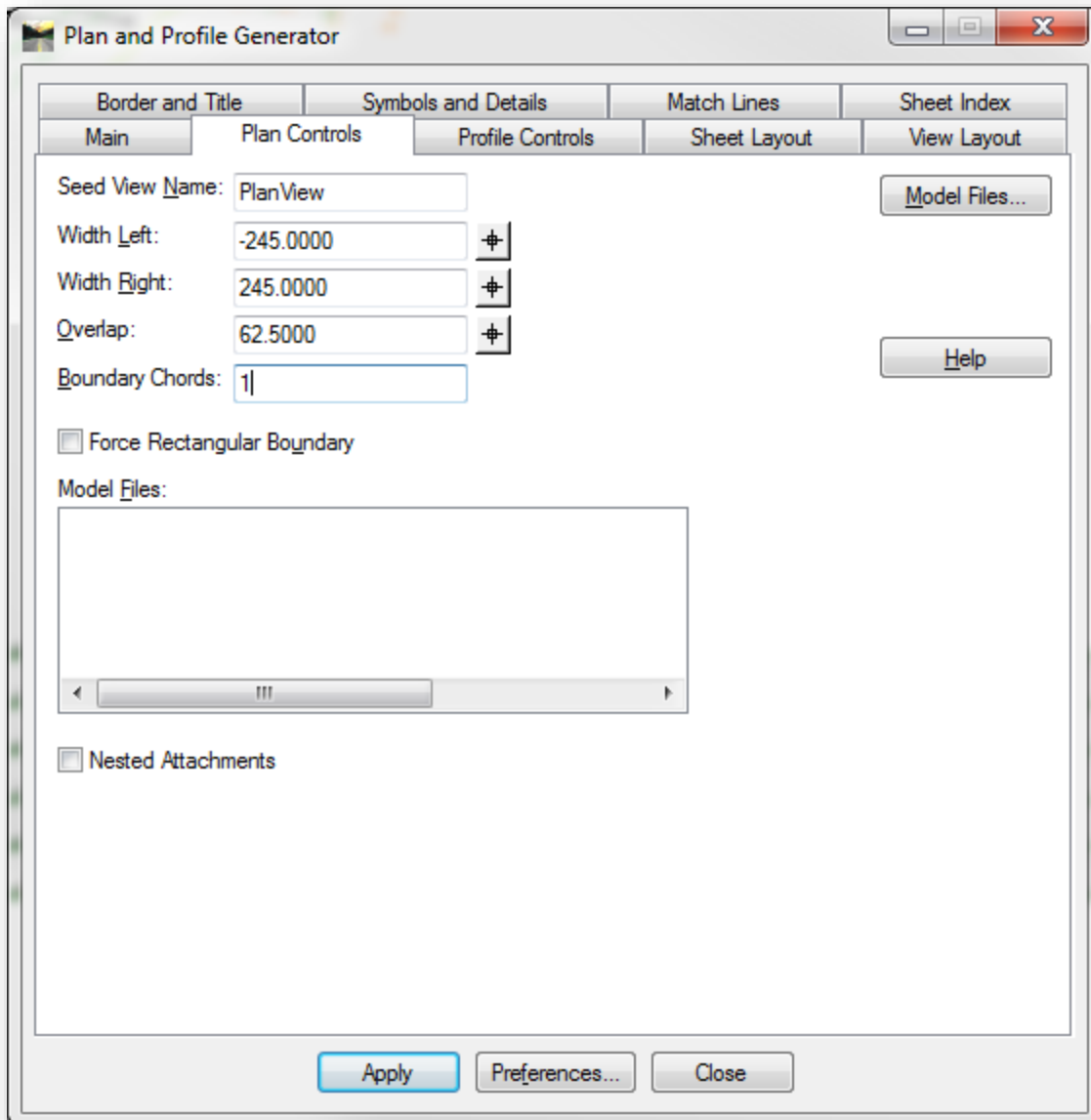
**Plan Controls Tab**

For the features on this tab, the preference defines the seed view name, the left and right widths and the sheet overlap.  You can attach you additional base drawings (Excont, Explan) by attaching these in the Model Files portion of the dialog.  If you maintain the attachments to Prplan and do not attach files with this tool, you will need to adjust your reference settings to enable Live Nesting via the Nested Attachments button.  Both are suitable methods, where possible, nested attachments have been enabled though, to remain consistent with earlier procedures from MX.

Nested Attachments



Profile Controls Tab

On this tab, customized values from the preference are the profile height, horizontal and vertical spacing, and the left and right margins.  Additionally, the Profile Preference is set to the IN Profile 50 consistent with this layout.  An item to note, no vertical alignment is defined.  Should the sheet be

cut with these settings as is, the profile will only display the existing surface along the horizontal alignment.



**Sheet Layout Tab**

The first item on this tab defined is the Sheet Number and Name. These are incrementing numbers and used in the Sheet Index for reviewing sheets. It should be noted that any value defined in these fields is only for reference in the Plan and Profile Generator and do not influence the naming of the sheet DGN files.

The Host File is the name of the first finished DGN from the sheet cutting process. Additional sheets are named sequentially from the last character of the file name. In the above example, the name is

Sht PlanProfile_50_1.dgn; each additional sheet would be Sht PlanProfile_50_2.dgn, _3.dgn, etc. Also, the preference defaults for the process of cutting a set of test sheets. As such, the file path has been set to the local C:\Projects\ folder. This has been done to alleviate issues with the cutting and re-cutting of sheets into ProjectWise. Sheets should be cut into this location until the desired end result is achieved at which point the sheets can be cut directly into the appropriate project path in ProjectWise.

The Seed Host File is the MicroStation seed file that InRoads will use as a base sheet when creating, clipping and bordering the references. This file will be copied and renamed each time a new sheet is cut.

The clipping boundary is an element that follows the end of the clipped reference for both the plan and profile. This feature is enabled and also enumerated to coincide with the names of the sheets for quick referencing to adjust annotation that may need to carry through from the base sheets.

Host File Content defines how the finished sheets are provided when cut. Single Sheet Each places each cut sheet into a separate DGN which is the normal convention. All Sheets in One places to the border and references next to each other in a single DGN and is dependent on the Sheet Location setting.

Sheet Location determines how the sheets are aligned when cut. The default behavior is to place the sheets along the alignment. One can adjust these to show up in a grid view as well. If Layout in Grid is selected, the Horizontal and Vertical Space items become available.

*Note: Sheets in InRoads are laid out along the alignment in the INDOT preferences. When viewing the finished sheets, InRoads does rotate the view to appear aligned with the border, however if one adjust the view rotation, the border and references will adjust their rotation and will appear rotated at the appropriate angle.*

*Also, if All Sheets in One is selected and used, the borders and references will be cut along the alignment and will appear overlapped as they are cut along the alignment.*

**View Layout Tab**

On this tab, one will find the values used to determine how the plan and profile line up on the sheet. When cutting INDOT sheets, these should not be adjusted from the values loaded with the preference. Also, the Scale value should be consistent with the scale of the sheet being cut.

Border and Title Tab

The values customized on this tab are the Scale, Reference File Name, and Custom Width and Height. As with the scale value on the previous panel, this should be consistent with the scale value of the sheet being cut.

 The Reference File Name is the name of the appropriate border for the sheet being cut. In this example, the border is INDOT_Border.dgn, and can be found in ProjectWise. This is preset in the preference and should not be adjusted.

The Sheet Size should be set to CUSTOM to enable the Custom Width and Height options. As shown, the 36 x24 is the standard size for a full size INDOT sheet.
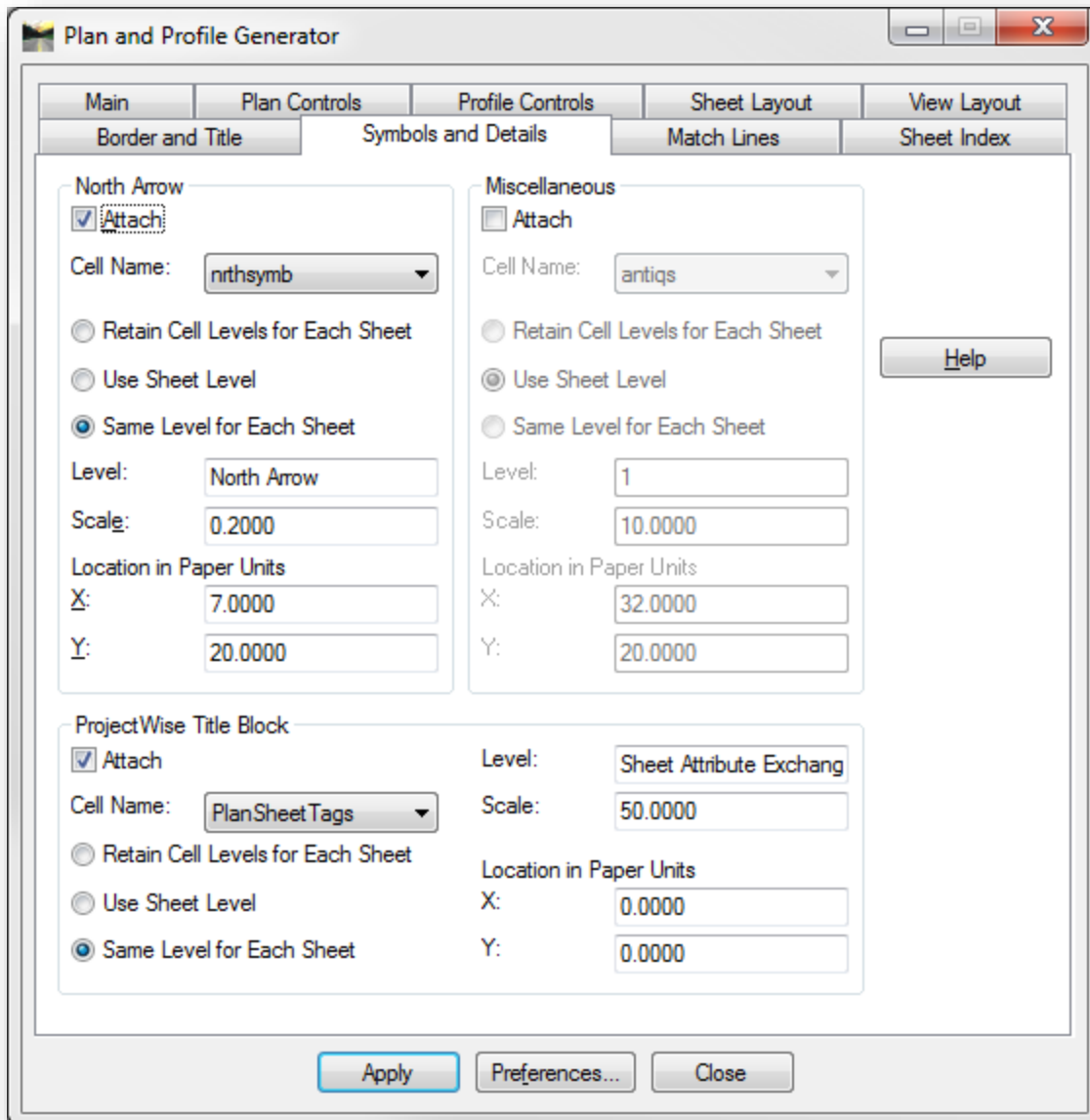
**Symbols and Details Tab**

On this tab, the North Arrow, and ProjectWise Title Block are enabled.

This tab is where having the INDOT_InRoads.cel attached is of paramount importance. Without the cell library attached, the default values of the cell names for both features will be antiquis if the cells are not attached, and upon sheet creation, the incorrect cell will be placed.

The North Arrow is enabled, and given a defined scale, and location on the cut sheet. It is place on the same level as the sheet border and can be moved as necessary.

Unlike MX, the high level of ProjectWise integration is evident in the inclusion of the ProjectWise Title Block option on this tab. This cell is placed automatically when the sheets are created, and should not be modified in any way for the title block integration to function properly.
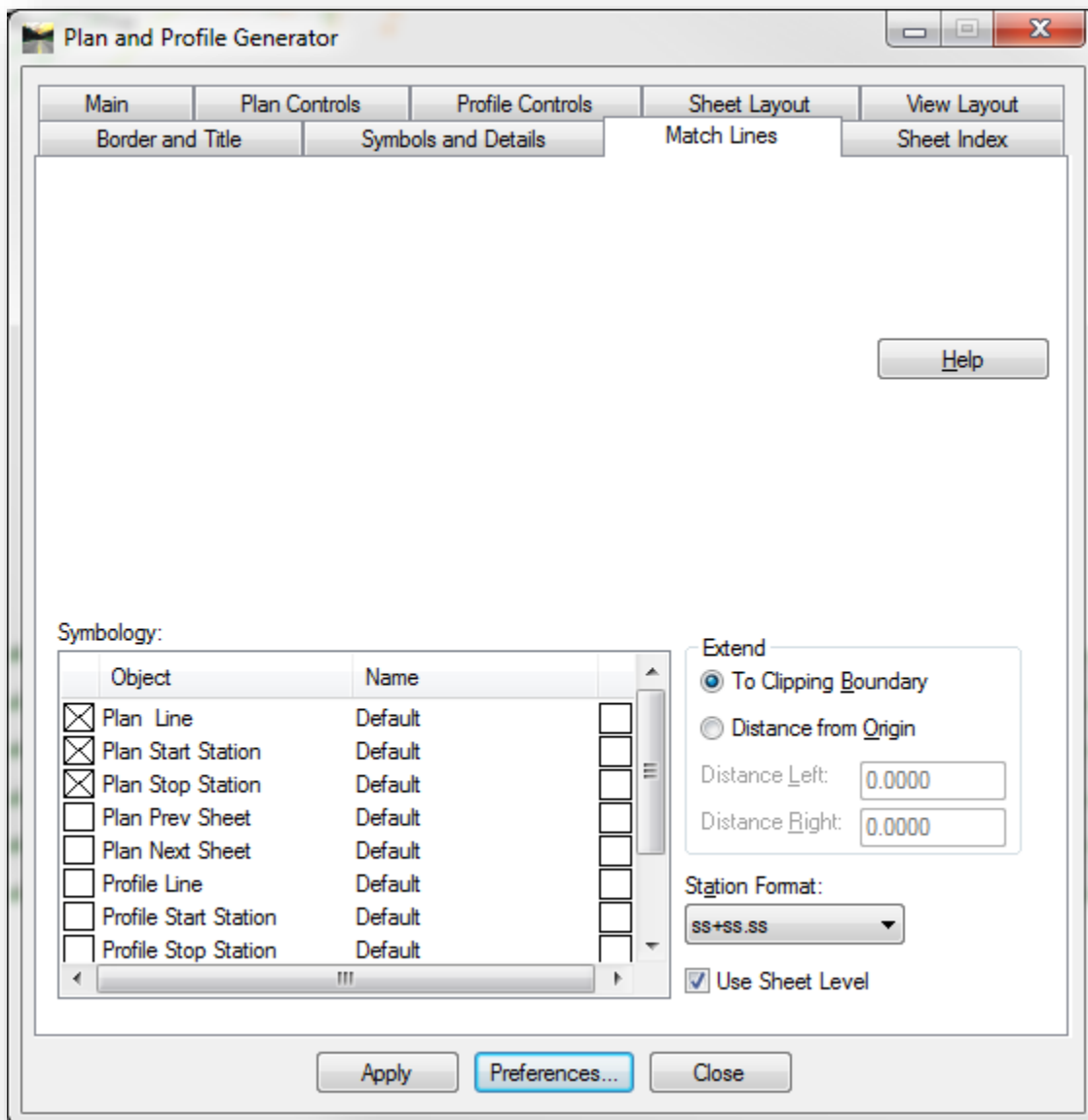


Match Lines Tab

On the Match Lines tab, the Start and Stop stations and linear indicator are all enabled, along with the placement of the station at the match lines.
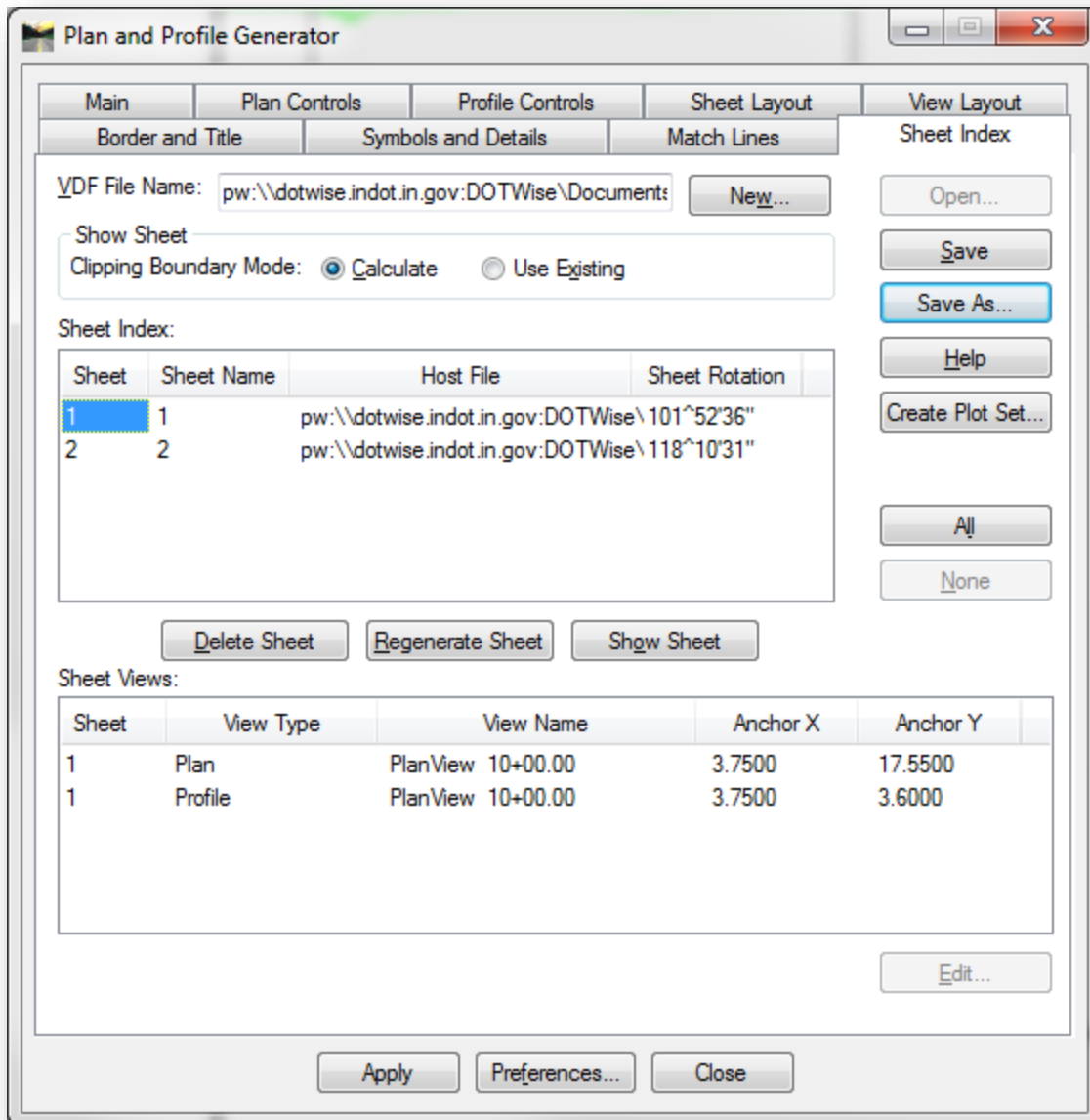
Sheet Index Tab

This tab becomes populated once sheets have been cut and are ready to be reviewed. Further discussion of the features on this tab will be covered later in this section once the sheet cutting process is complete.

### 7.5-3   Cutting Sheets

At this point, you've reviewed the preferences and the information that is pre-populated on each tab of the Plan and Profile Generator. For the next example, you'll be looking at a three sheet plan profile set and run the steps required to cut the sheet. This procedure will follow the process provided in the Bentley InRoads Plans Production course guide. To recap this process:

1. Start Plan and Profile Generator and select a preference
2. Set horizontal alignment and station limits
3. List model files
4. Define vertical alignments and surface for profiles
5. Set the host file
6. Set the title block data
7. Set plan views
8. Set profile views based on plan limits
9. Save the VDF file

1.  As noted previously, start the Plan and Profile Generator from the *Drafting -> Plan and Profile Generator* menu item.  With the generator loaded, select the Preferences... button and select IN PW Plan Profile 50 Scale.

2.  With the preference loaded, navigate to the Main tab.  Select the appropriate horizontal alignment that sheets should be laid out along.  This can be preset with the active Horizontal Alignment, or can be picked interactively.
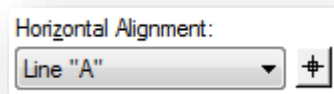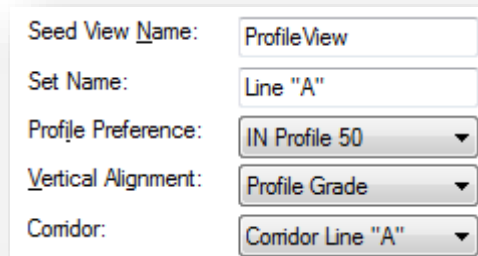


With the Horizontal Alignment selected, the Station Limits will default to the full extents of the alignment.  If you want to cut a different station range; adjust the start and stop accordingly.  The Length should be left alone, as this is a predefined value determined by the scale and stored in the preference.  The full extents will be used in this example.
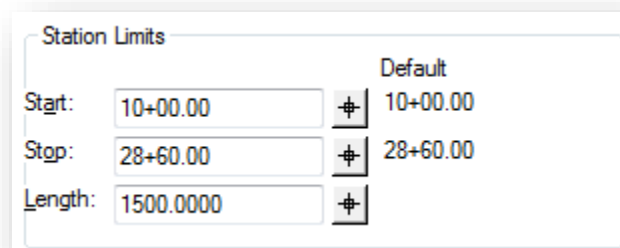


3.  List Model files on the Plan Controls tab.  This tab will be populated automatically with the name of the base drawing currently open.  If additional files such as the existing contours or additional base drawings are not included in this list, the live nesting for each base drawing reference in the finished sheet (normally Prplan 50.dgn) may need enabled.  Additionally, the Live Nesting toggle on this panel can be enabled as well.
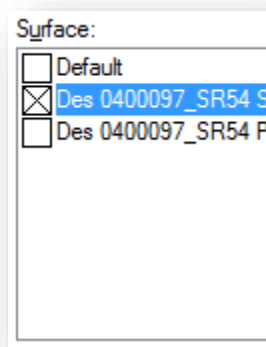
4.  Now that you have a horizontal alignment and associated vertical alignment, you can define the profile information on the Profile Controls tab.  In the following illustration, one can see the

appropriate Profile Preference that coincides with the scale of our finished sheet is enabled. Additionally, the appropriate Vertical Alignment has been selected. Finally the Corridor section is filled out. This will only show when a corridor with super elevation is defined for the selected alignment.
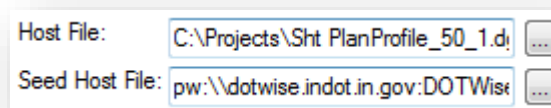


Next, in the Surface section, you've selected the surface representing your TOPO model with its associated triangulation.



5.  For the next item, the Host File needs defined. Navigate to the Sheet Layout tab. With the InRoads/ProjectWise integration, our Seed Host File will be located in ProjectWise, and is preset in the preference. The Host File itself can be placed in either on the local PC for test cuts, or in ProjectWise for finished sheets.



6.  In a diversion from the InRoads Plans Production course guide, this step six leads to the Symbols and Details tab to verify that the ProjectWise Title Block is enabled. This is defined in the preference, however if you see a cell name other than PlanSheet Tags, verify that your cell library is attached and re-start the Plan and Profile Generator and reload the appropriate preference.

7.  The next step is to define the plan views.  Navigate back to the Main tab.  Set the Method to Plan Only, and then enable the Use Station Limits option.  Make sure that Generate Sheets is disabled, and finally verify that Station Lock (*Tools -> Locks -> Station*) is disabled as well.  When appropriately configured your panel should look like the following:



Now, select Apply, and note the information populated in the Plan Views region of the tab.

By defining our plan views in this way (with station lock off, and not generating the sheets) the first sheet in the set is ensured to be a complete sheet. If station lock is on, the potential for a partial first sheet exists in order to start subsequent sheets on an even station. Station Lock should remain disabled through the next step.

8. With the plan view stationing defined, one can now look at defining the coincident profile views. As discussed earlier in this document, a profile drawn up using the *Evaluation -> Profile -> Create Profile* tools is not usable by the Plan and Profile Generator. Due to this, InRoads will prompt you to regenerate and replace your profile as part of the sheet creation process.

Again, on the Main tab, the Method needs adjusted. Set this to Plan and Profile. Then change the Plan Views to Use Plan Views. This will have InRoads create the profiles and sheets using the same per sheet station ranges as you just defined in the previous step. Finally, the Generate Sheets option needs enabled. When the tab looks similar to the following, select Apply to create the sheets:

After hitting Apply, InRoads will prompt in one of two ways.  If there is no existing profile created by Plan and Profile Generator, you will received a notification in the lower left corner of the MicroStation window prompting for the location to place these new profiles.

If there's a series of pre-existing profiles, InRoads will prompt to regenerate and replace the existing ones.  If this is the case, the following dialog will be shown:
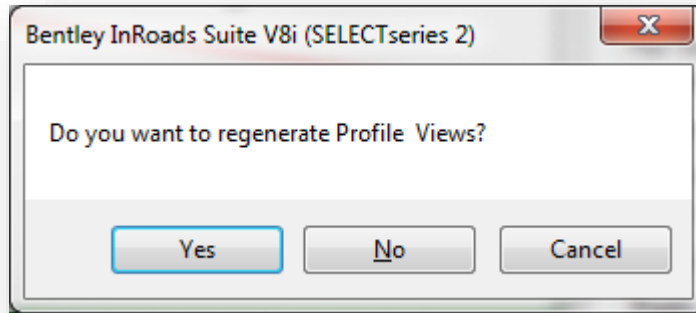
If Yes is selected InRoads will create a completely new set of profiles along with any required adjustments to the layout range and location.  If No is picked, InRoads will prompt for a location, but will not re-create the profiles.

9.  With the sheets completely created at this point, one can now create a VDF file.  Navigate to the Sheet Index tab.  The very first area is where this file is defined:
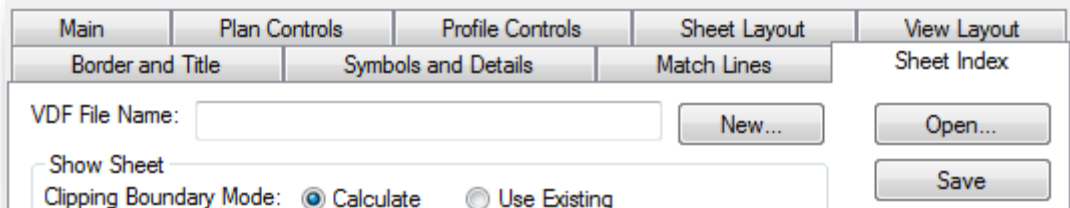


To create a new VDF, select the Save/Save As option from the right side of the tab.  This will provide either a ProjectWise or Windows Save dialog depending on where InRoads was started from. Navigate to the project location, and provide a file name, then select Save.   This will place a copy of the VDF in the location specified.  With the VDF saved, one can reload this file in order to re-cut, or review sheets already cut, similar to opening an APL file in MX.

*Note:  In order to preserve finalized sheet layouts, do NOT select the New... button.  This will prompt to save the existing VDF and clear out any sheet information in the Plan and Profile Generator that has been filled in since the last VDF save.*

At this point, the Sheet Index should be completely populated with data regarding the finished sheets.  The functionality of this page allows for the fine adjustment of sheets, removal of unnecessary sheets, regeneration of sheets, or the ability to browse between sheets.
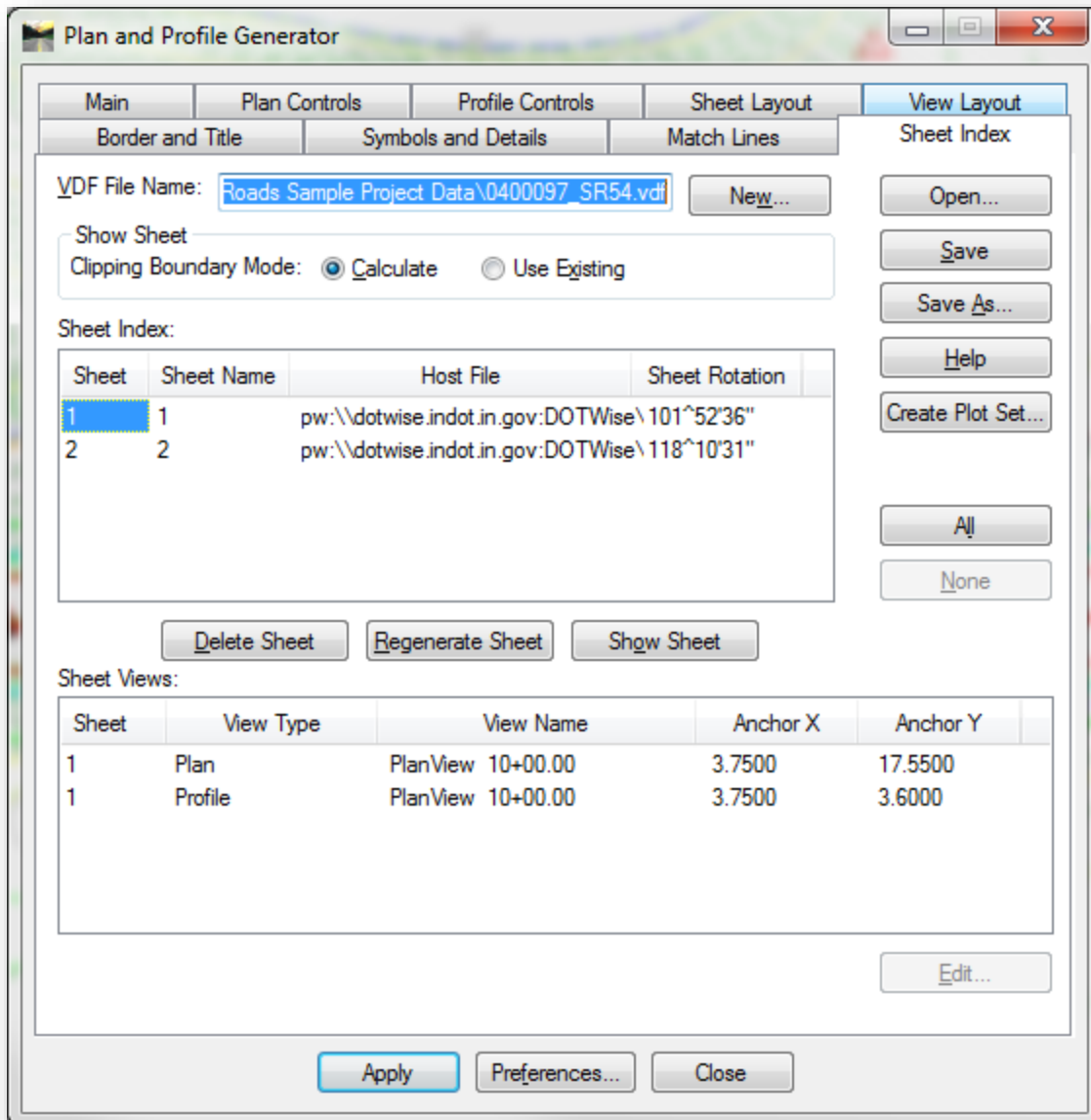
## 7.5-4    Publishing Sheets to ProjectWise

The previous example runs through the creation sheets to a non-ProjectWise location.  For this section, ProjectWise will be the location where the sheets are published.  All steps are exactly the same, except for step 5, which is where the change to publish to ProjectWise is made.

From the IN PW PlanProfile 50 Scale preference, the Host File defaults to the C:\Projects path, outside of ProjectWise:

To change the location where the files are saved, select the browse button at the end of the Host File line and you will be presented with an InRoads/ProjectWise Save As dialog where the appropriate path can be selected.  The completed Save As window is shown below:



Like other ProjectWise file functions, it's highly recommended to keep the Name, File name, and Description consistent.  The Host File line will now show the ProjectWise path that was specified:



Once the sheets have been created, the Sheet Index tab will now show the following information in the Sheet Index section now show the appropriate ProjectWise paths:

In addition to creating the files, InRoads will also make sure the new sheets are checked out.

In the event you receive the following dialog, make sure that sheets you're either recreating or editing are checked out.
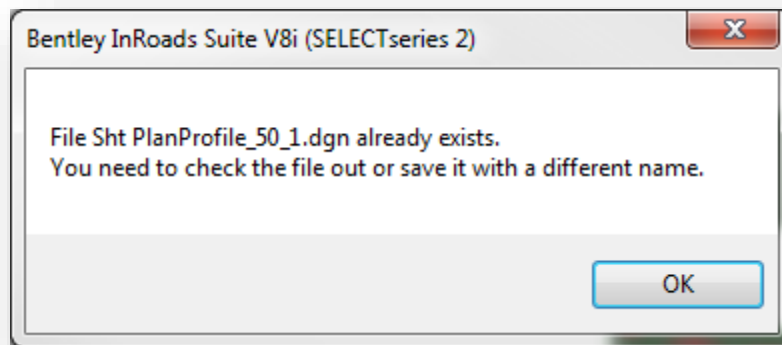


## 7.6    Annotation and Text Drawing Cleanup

In this section, you will review the process of adding various annotations to InRoads drawings, and the process of cleaning this data up after it's been created.  Most of the procedures for clean up are performed via basic MicroStation; these procedures have been carried over from the previous MX documentation as they are still relevant.

### 7.6-1    Setting Up an Annotation Drawing

All plan view annotation will be drawn in a new drawing in InRoads.  The new drawing of the alignment annotation should be called *Annotate alignment <Alignment Name> <Scale>.dgn.*  If you have multiple alignments that you wish to have annotated, you will need to repeat all of the following steps for each string in a new plan display with similar naming.  PlanProfile sheets will need to have been created in order to properly align the text for these other M-string annotations.

Using standard ProjectWise functionality, create a new DGN in the project path named Annotate alignment <Alignment Name> <Scale>.dgn (Ex. Annotate alignment LineA 50.dgn).  Make sure to use the same seed file location with the same base drawing units (metric, US or US survey foot).

### 7.6-2   Adding Horizontal Alignment Annotation

Unlike MX, InRoads does not integrate the alignment annotation commands into the alignment/profile creation tools.  In order to annotate your profile, you need to first have a horizontal alignment for horizontal annotation purposes; and a vertical alignment and profile for vertical annotation purposes.

With a horizontal alignment drawn in the display (*Geometry -> View Geometry -> Active Horizontal*), navigate to *Geometry -> View Geometry -> Horizontal Annotation.*
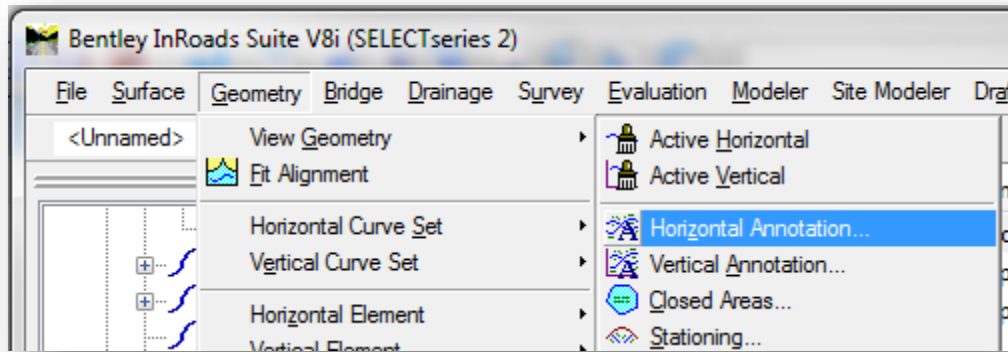
**Horizontal Annotation Menu Location**

This will present the View Horizontal Annotation tools.
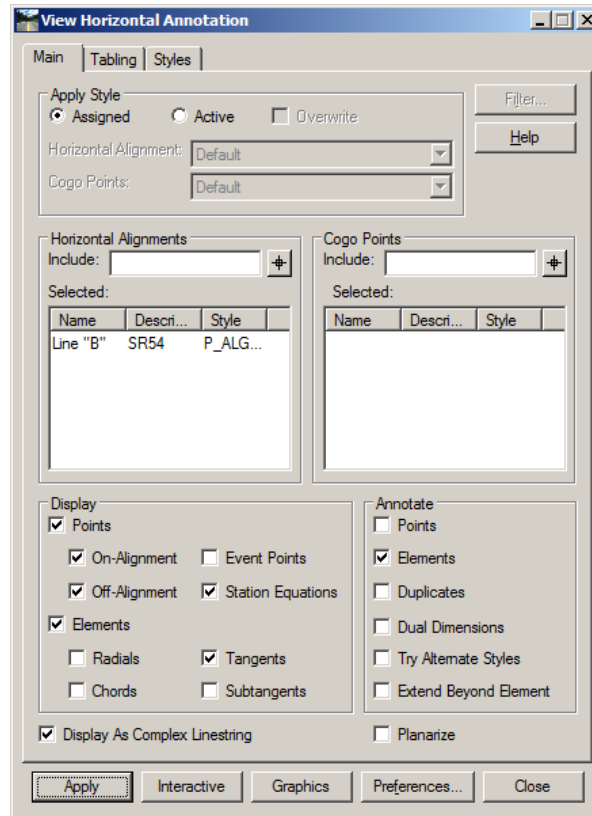
**View Horizontal Annotation**

In order to use this tool, one should first load the INDOT specific preference, and then select their alignment.  To select the alignments that should be annotated, select the graphical selector under the Horizontal Alignments portion of the Main tab.  You will then be prompted to select the alignment to annotate.

With the alignment now listed in the Horizontal Alignments section, select Apply.  This will place annotation on the alignment listed.  Note that InRoads will allow the annotation of multiple horizontal alignments at the same time, as long as they are in the same active geometry project.
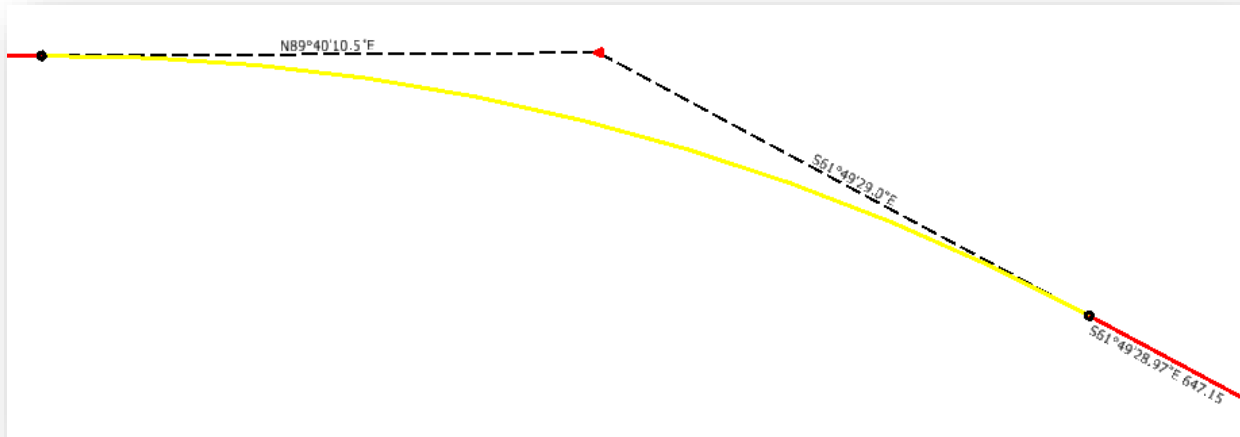
Horizontal Annotation Sample

Due to the methodology that InRoads uses for text placement in conjunction with Styles and Named Symbologies, you may see results similar to the previous illustration.  In this instance, you will note that on a right hand curve, the Bearing and Radius values are upside down when related to final sheet placement (legible from left to right when view in landscape or right hand portrait).  Therefore, you must clean these annotations manually prior to plan completion.

### 7.6-3    Adding Horizontal Curve Set Annotation

Unlike MX, which had all annotation features as part of a single tool, InRoads splits the various annotation functions in to numerous tools, providing a higher degree of customization and additional flexibility.  This change in application can be found in the placement of horizontal curve annotation.  As shown in the previous section, horizontal annotation for bearings, distances, radii, etc can be found in the View Horizontal Annotation tools.  Curve annotation is placed by a separate tool called *Curve Set Annotation.*

This tool is found under *Geometry -> View Geometry -> Curve Set Annotation.*
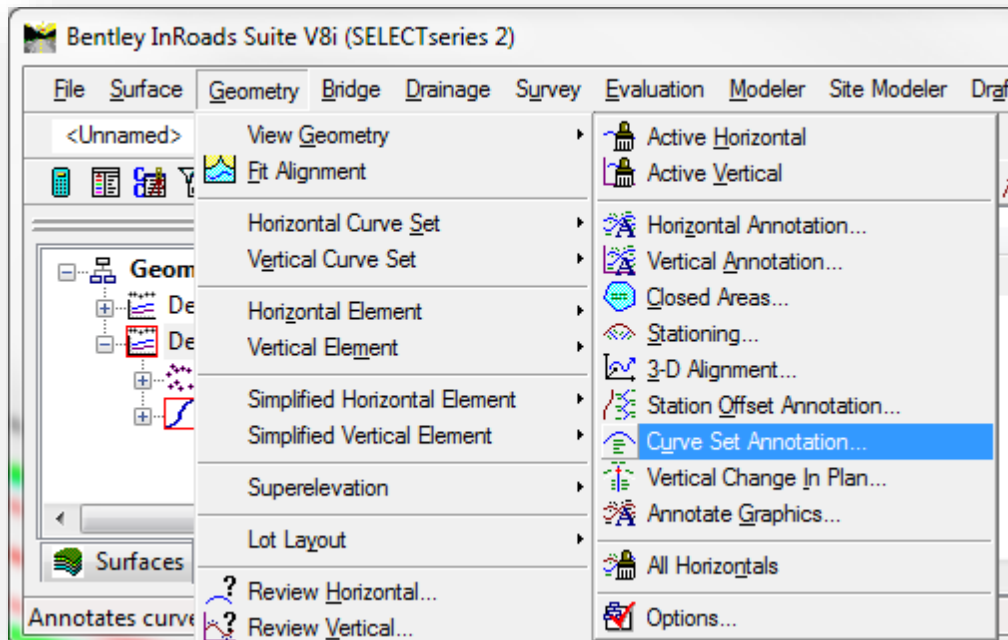
**Curve Set Annotation Menu Location**

Similar to other InRoads tools, the Curve Set Annotation tool will open with the active horizontal alignment selected. With this preset, verify that the correct preference is loaded. INDOT customized preferences are provided.
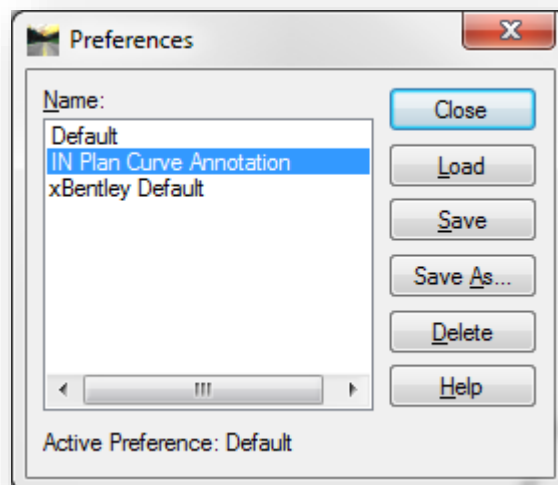


**Curve Set Annotation Preferences**

With the preference loaded, make any necessary adjustments then select Apply. This will place the curve annotation at the center of the curve. This will need moved as part of plan clean up.

CURVE # 1
PI = 18+64.07
Delta = 28°30'21" RT
D = 4°00'00"
R = 1432.39'
T = 363.86'
L = 712.64'
E = 45.49'
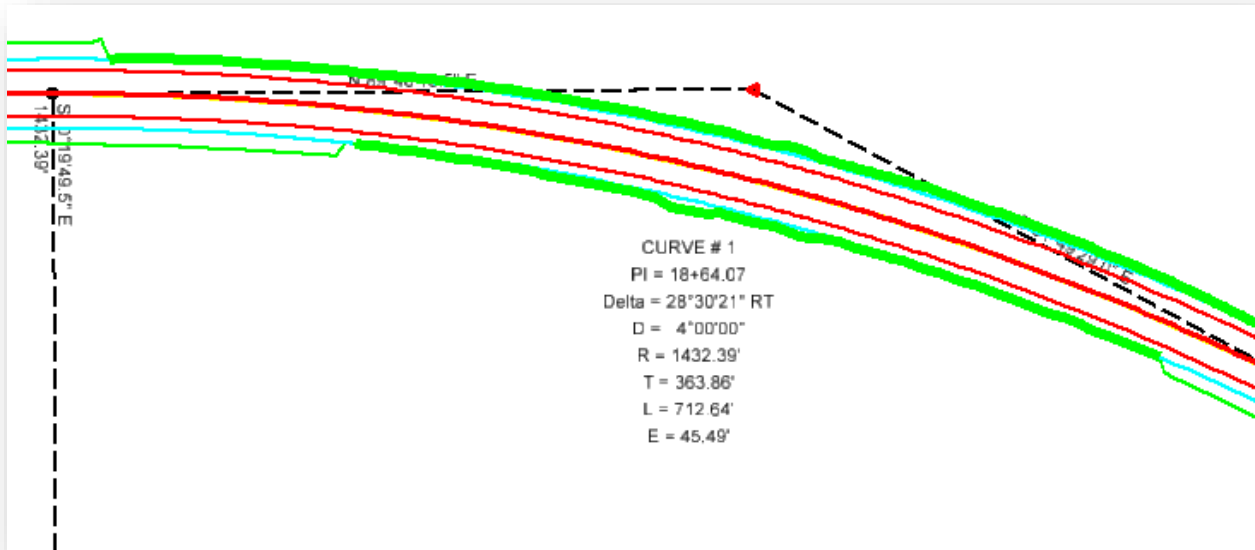
Finished Curve Set Annotation

### 7.6-4    Adding Profile Annotation

To add vertical annotation, a similar process will be followed only using the vertical versions of the tools used previously.  Unlike the previous steps for adding horizontal annotation, profiles and profile annotation cannot be placed without the final cut profile displayed.  Since your sheets will be cut from Prplan 50.dgn, your profile will be displayed and annotated in this drawing.

*Note:  Remember that a vertical alignment and its associated annotation cannot be created without a pre-existing profile. Please refer to Section 7.4-5.  Additionally, for annotation to properly carry through nested references, you must make sure that annotations are placed on the appropriate split profile created by the Plan and Profile Generator.*

With the existing profile and proposed vertical alignment drawn on it (*Evaluation -> Profile -> Create Profile* and *Geometry -> View Geometry -> Active Horizontal*), navigate to *Geometry -> View Geometry -> Vertical Annotation.*
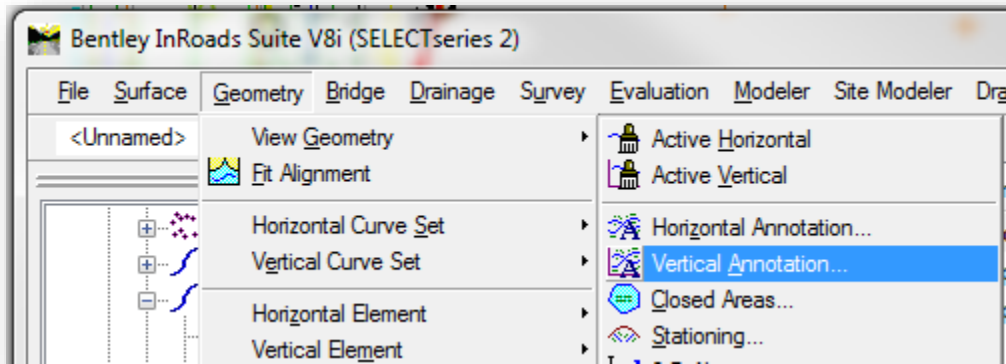
**Vertical Annotation Menu Location**

This will open the View Vertical Annotation tools.
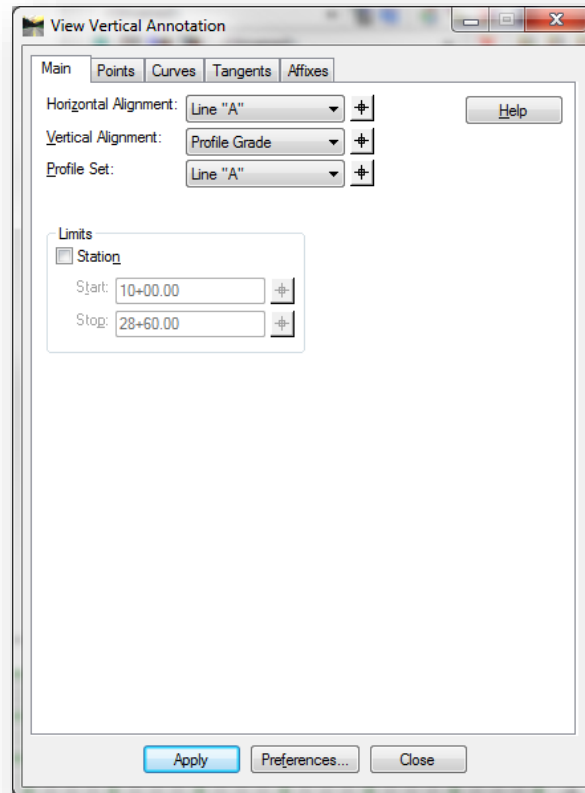


**View Vertical Annotation**

In order to use this tool you should first load the INDOT specific preference, and then select their alignment. To select the alignments that should be annotated, select the graphical selector under

the Horizontal Alignments portion of the Main tab. You will then be prompted to select the alignment to annotate.

As shown in the previous screen capture, you must define the appropriate horizontal, vertical and profile set to place your alignment on. Additionally, there is an INDOT specific annotation preference to display the appropriate information in the correct format.

When placing the Vertical Annotation, there will be some manual clean up required as InRoads preferences don't allow for the specific configuration of all annotation as is considered INDOT standard.

In the following screen capture, the default vertical profile annotation is shown. What is immediately noticeable is that the PVI Station and Elevation are annotated below the PVI and not with the Vertical Curve (VC) length.
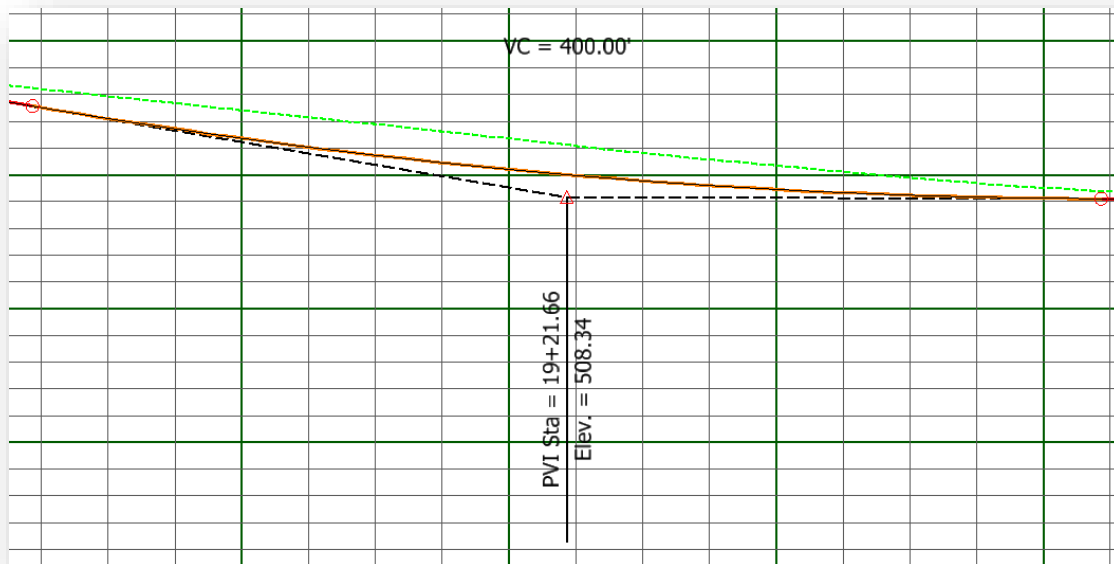


**Vertical Annotation Sample**

In order to appropriately clean up the annotation:

1. Use the Edit Text tool and select the PVI Sta text to your clipboard.
2. Use the Edit Text tool and select the VC text.
3. Place your cursor to the right of the VC text and make sure that it's not highlighted.
4. Place a single return and then paste the PVI Sta text on the empty line from the previous step.
5. Repeat steps 1-4 for the Elevation text.
6. Adjust the placement of the merged PVI Sta/Elev/VC text node.
7. Delete the PVI Sta and Elev text along with the leaders from the display.

Upon the conclusion of these edits, a finished vertical profile annotation will appear similar to the following.



PVI Sta = 19+21.66
Elev. = 508.34
VC = 400.00'
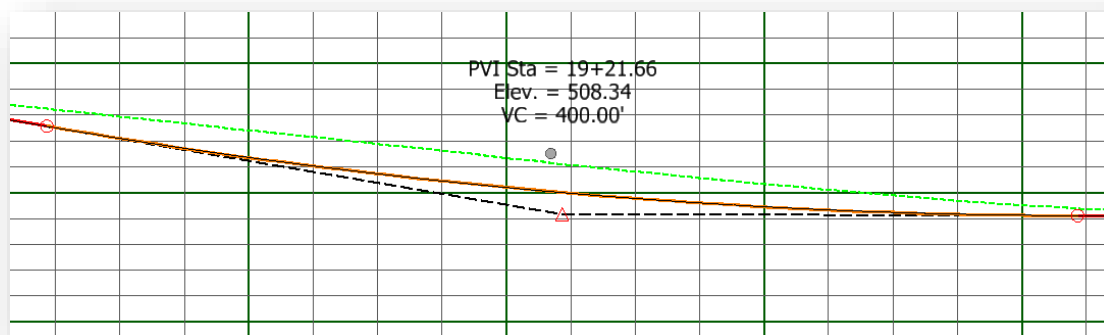
**Finished Vertical Annotation at PVI**

Unlike MX, the basic geometry annotation tools only provide annotation for the actual alignment features of the profile, which does not include the existing and proposed elevation annotations. These features are annotated by a separate set of profile annotation tools.

To add the elevations, one needs to use the tools located under *Evaluation -> Profile -> Annotate Profile*. Much like the vertical alignment annotation tools, an existing profile must exist before you're able to annotate the information. A preference has been created, adhering to INDOT annotation standards, and is named *IN ProfileElevations*.
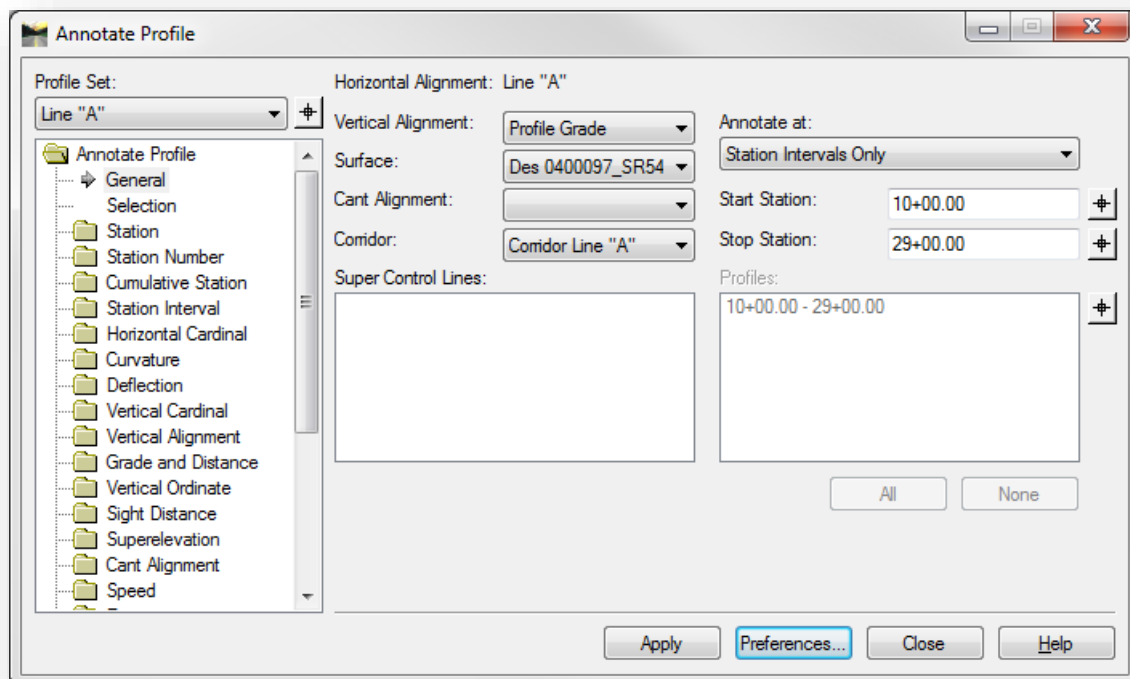
## Profile Annotation Panel

Selecting the appropriate Profile Set, Vertical Alignment and Surface will allow InRoads to appropriately annotate the profile elevations. When annotating multiple portions of a profile set (finished profiles cut for plan profile sheets), it is necessary to make sure that the relevant station ranges are selected in the Profiles are of the General section as shown below:
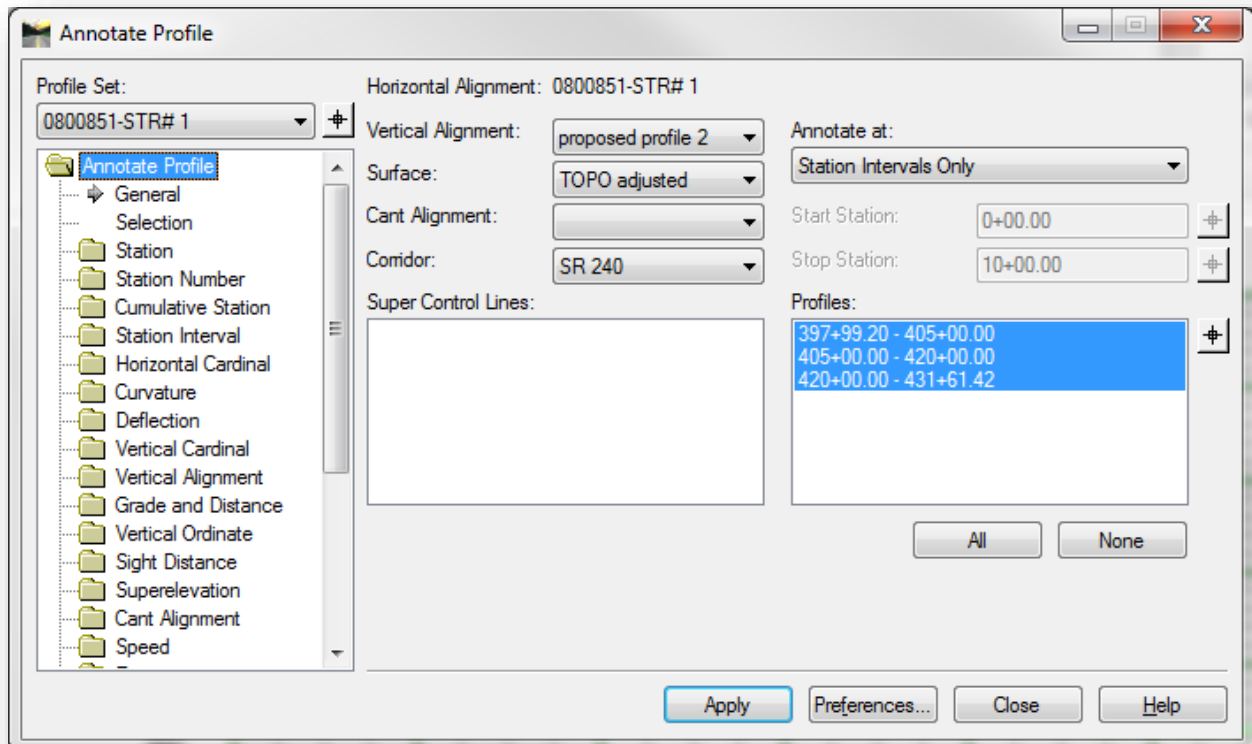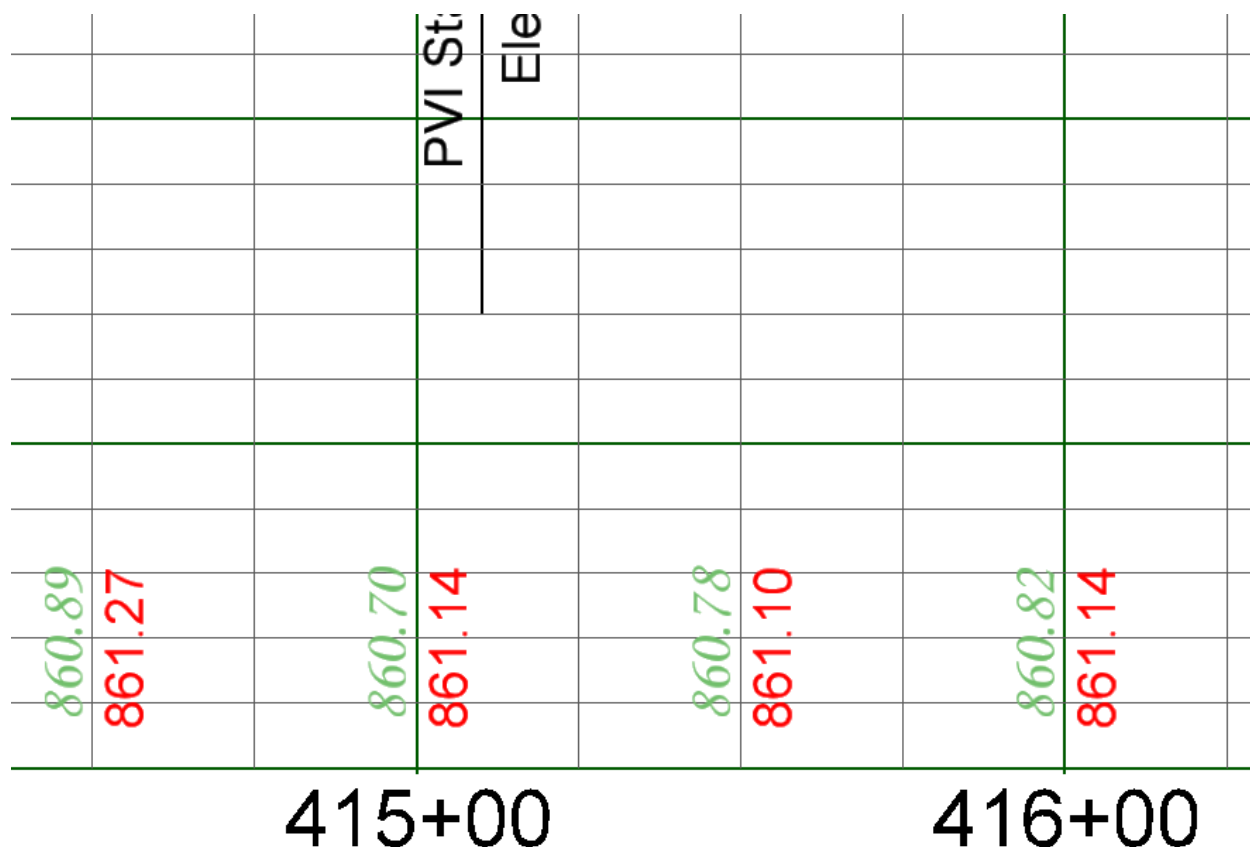
Existing/Proposed Profile Elevation Annotation

### 7.6-5   Station Offset Feature Annotation

Next is the placement of Station/Offset annotation.  This will provide the appropriate station offset and feature names at the location of the feature in the plan view.  Unlike DCRepo and Geometric Annotation with MX, this does not place the text at the edges of the plan view, so additional clean up using MicroStation functionality will be required.  This example will provide the necessary steps to adjust and move the annotations appropriately.

Unlike MX, InRoads will scale and rotate the border along your alignment.  With this change, it's to your advantage to place your annotations directly on the cut sheet, leveraging the rotation of the border and view to align them.  With this being the more flexible and direct method of placing annotation on our sheets, this will be the example you use going forward.

Alternatively, you can have a drawing created specifically for this kind of annotation and for each alignment.  This will require creating a new drawing within InRoads called *Annotate station offset <Alignment Name> <Scale>.dgn*.  Using standard ProjectWise functionality, create a new DGN in the project path named Annotate station offset <Alignment Name> <Scale>.dgn (Ex. Annotate station offset mcac 50.dgn).  Make sure to use the same seed file location, with the same base drawing units (metric, US or US survey foot).

If you have multiple sheets or for your second method, M-strings, that you wish to annotate about, you will need to repeat all of the following steps for each sheet/string in a new plan display with

similar naming.  For both methods, make sure that your Survey Surface DTM file is open and active for use with the Annotation tools.

### 7.6-5a    Feature Annotation

With your drawing opened, you can now look at using the *Surface -> View Surface -> Annotate Feature...* tool to place the station and offset of your survey features.  This tool, along with many others in the InRoads Suite, allows you to specify a fenced area that you'd like to work within or outside of.  As shown in the following screen capture, place a fence over the plan portion of your DGN, which is denoted by the shaded block.
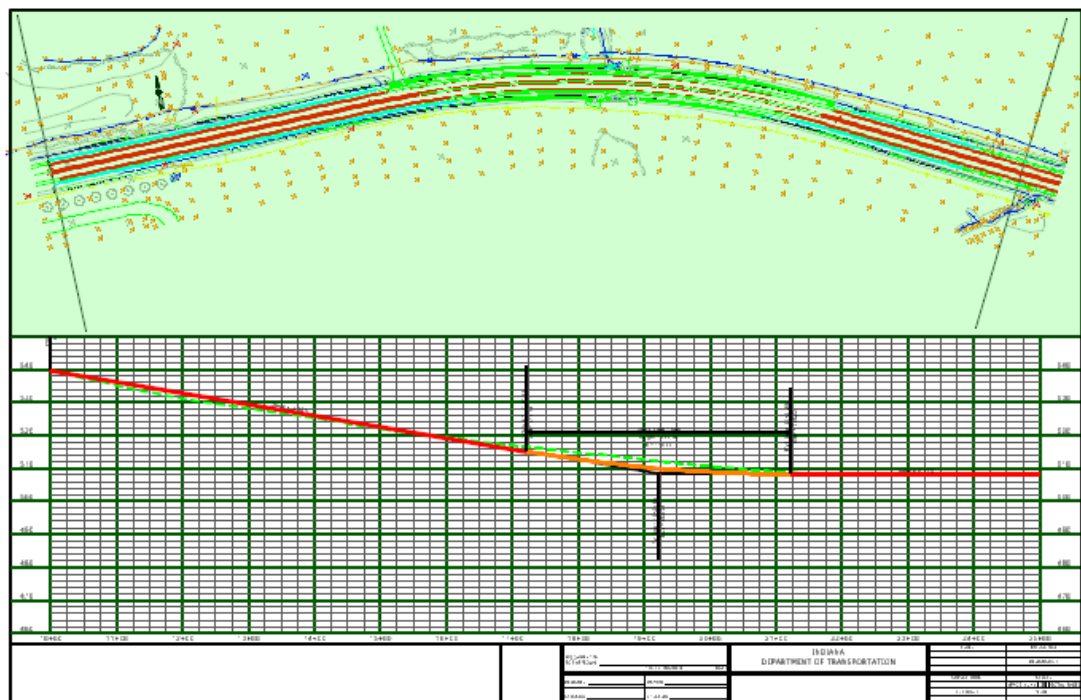


**The Plan View Highlighted**

Remember, the color of this shading is dependent on the Mode of the fence that you've placed, in the above example, the block was placed with an Inside Fence Mode.  For the purposes of the InRoads tools that use this functionality, the actual fence type isn't important, as each tool allows you to define how InRoads should respect the fence.

With your plan area now highlighted, start the *Feature Annotation* from the *Surface -> View Surface* menu.  This tool can place various pieces of annotation relative to your survey surface features and their type, be it a point or linear feature.  Some examples that both will annotate are the Feature Name, Description and Style.  Point features (which you will look at for Station/Offset annotation)

include items such as Northing, East, and Elevation, and the selected station of a Centerline.  Linear features will annotate items such as Length, Bearing, and Slope.

Of particular interest, we want to examine what is included for point features using the IN Survey Sta Offset preference.  Select the Preferences button and load this preference at this time.  For your Station/Offset annotation, you'll see that on the Points tab Centerline Station, Offset and Feature Description are all enabled, along with the precision and format being adjusted accordingly.  These items will all be annotated with respect to the features Default Text style setting.

**Annotate Feature** — Main | Points | Line Segments | Slope Direction | Crests and Sags

Location: Center Center

Horizontal Alignment: Line "B"

Annotate
☑ Every Vertex

☐ At Interval: 10.0000

◉ Along Feature

◯ Along Horizontal Alignment

Start Station: 10+00.00

Stop Station: 28+60.00

| | Object | Column | Row | Prefix | Suffix | Precision | Format |
|---|---|---|---|---|---|---|---|
| ☐ | Northing | 1 | 2 | | | 0.12 | |
| ☐ | Easting | 1 | 3 | | | 0.12 | |
| ☐ | Elevation | 1 | 3 | | | 0.12 | |
| ☒ | Centerline Station | 1 | 1 | | . | 0.12 | sss[+ss.ss] |
| ☐ | Feature Station | 1 | 1 | | | 0.12 | ssss.ss |
| ☒ | Offset | 2 | 1 | | | 0.1 | |
| ☐ | Feature Name | 1 | 7 | | | | |
| ☒ | Feature Description | 3 | 1 | | | | |
| ☐ | Style | 1 | 8 | | | | |

☑ Drop Station Equation Name

[ Apply ]  [ Preferences... ]  [ Close ]  [ Help ]

Annotate Features/Points Tab

To limit the features being annotated, you'll use a pre-made filter to assist in the selection of your items.  On the Main tab of the Annotate Feature dialog, select the filter button.  On the filters, you want to use the SurveyStationOSFeatures filter option as shown.
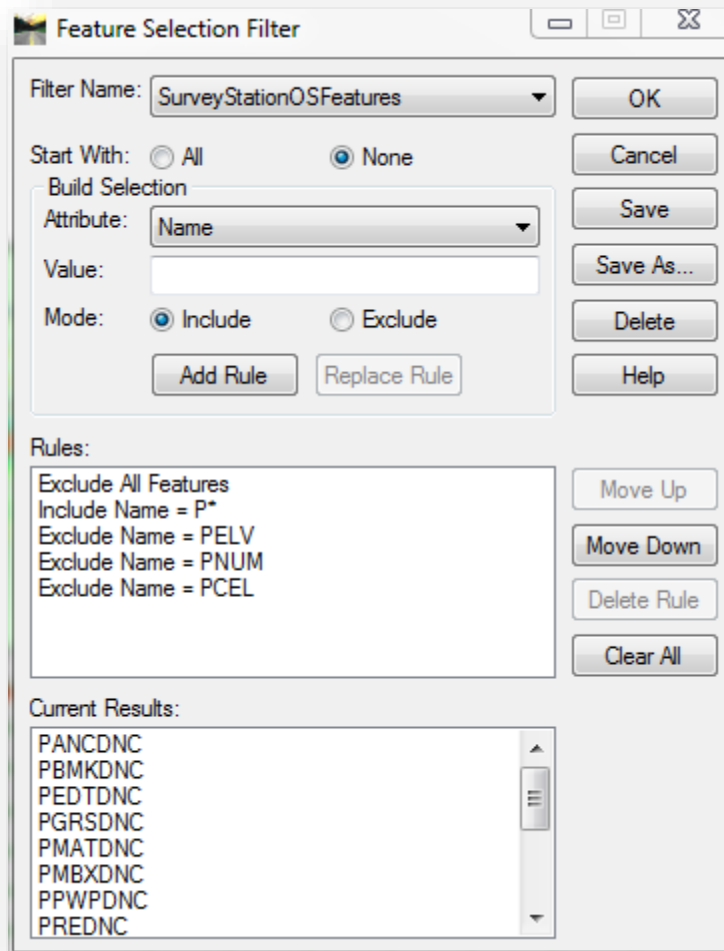
**Station Offset Filter Settings**

With the filter selected, you'll see your list of features shrink greatly to only those point features that are allowed through the filter. Be aware that should you not have any features show up, you may have the wrong surface selected, so verify that the Survey Surface is selected on the main tab.

Next, you need to set the fence mode. With your fence around the plan view of the sheet, make sure the Fence Mode is set to inside. This will restrict annotation to only being placed on features that exist in this fence; anything that falls outside it will not be included. Finally, you need to select your features by right clicking in the Features: area and selecting all.
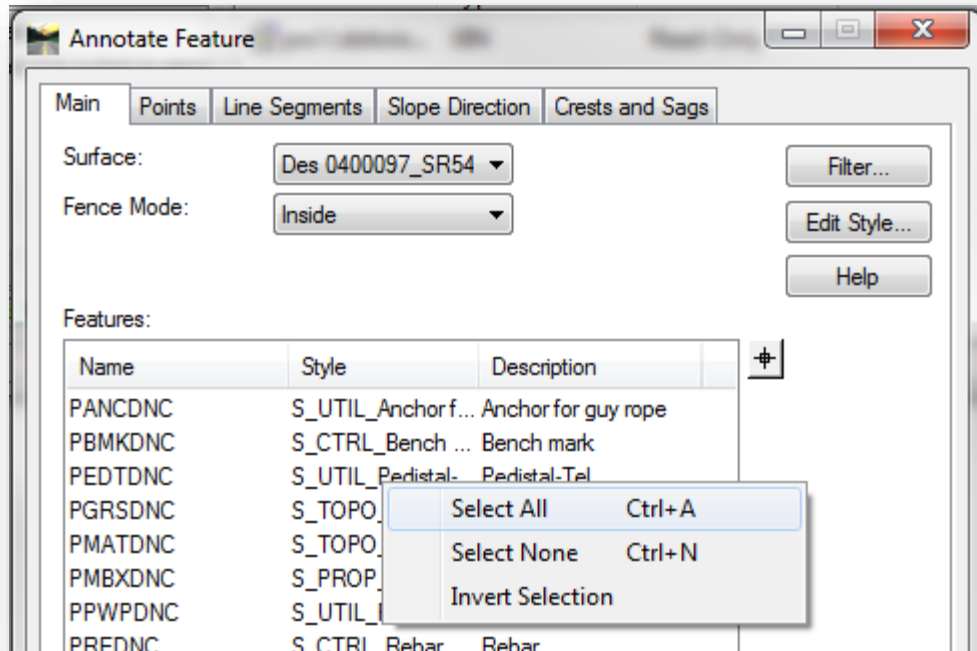
**Selecting All Features**

All other settings have been set appropriately with the Preference loaded earlier in the exercise.  Go ahead and select Apply at this time.
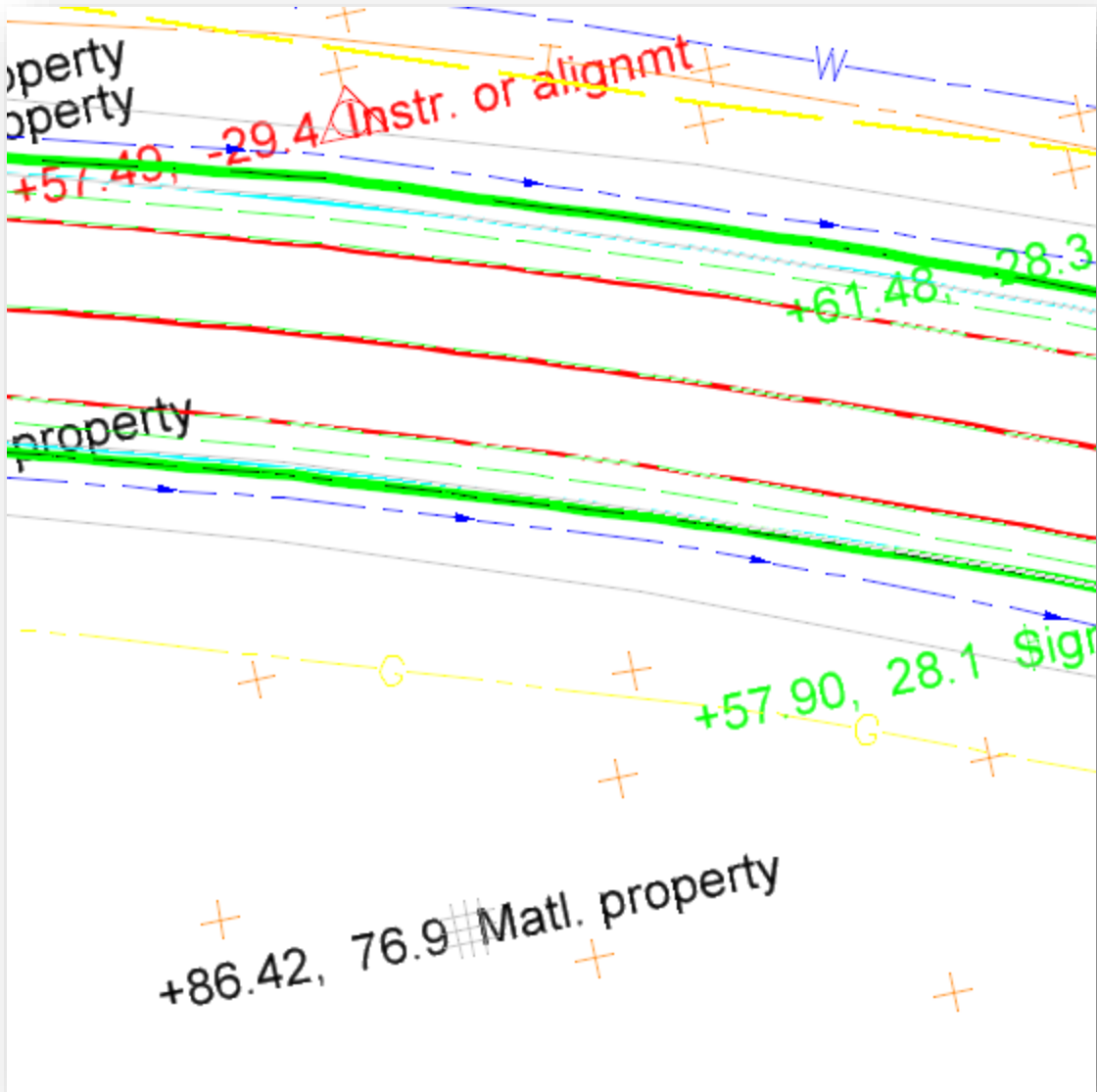
**Example Annotations**

### *7.6-5b     Feature Annotation Clean Up*

Unlike DCRepo and Geometric Annotation, InRoads does not provide capabilities to automatically align annotations to the border as shown in the previous example.  In order to get the annotations placed appropriately, you will need to look at using standard MicroStation tools.

First you need to enable the TextUtil tools.  These can be found under Annotation Text on the Task Navigator.
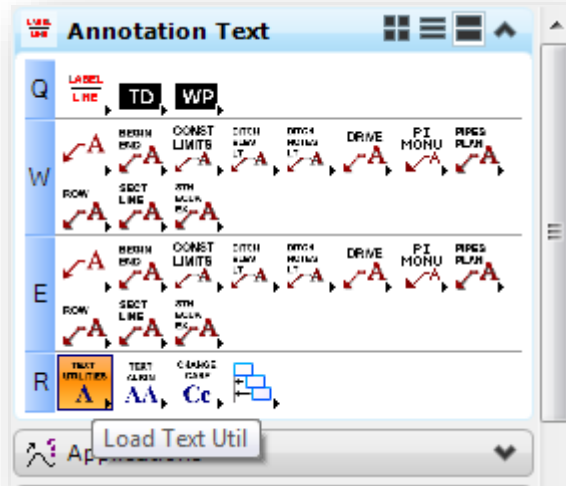
TextUtil Task Button

By loading the TextUtil tools, you will now have access to the TextAlign tool that is found next to the TextUtil button on the Task Navigator. Just as you placed a MicroStation fence over the plan view to place our annotations, you will do the same thing, as TextAlign will use this fence as a limiting factor in what text to rotate. TextAlign also uses the active angle relative to your view. In this instance, you want to use an active angle of 90 degrees.

To set the active angle, you can use one of three methods. The first is to set it under the Active Angle leaf of the *Settings -> Design File* menu item. The second is via the MicroStation key-in AA=90. Finally, the active angle can be set by invoking any tool that uses this value in its configuration such as the Rotate tool.

With the active angle and fence set and the TextAlign tool started, set the tool configuration as shown.
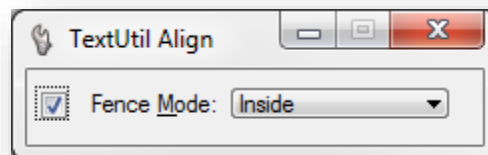


TextAlign Settings

When ready, select a data point any place in your MicroStation view. Almost all plan text should now be rotated 90 degrees and aligned properly with the frame. Some annotations may not have been picked up in the fence however, so these should be aligned by selecting them individually (these are normally along the edges of the plan view where the fence would have crossed but not included them). Finally, remember, should any additional text have been placed prior to these annotations,

it's likely they too will have been rotated, so be careful when selecting what text you're rotating. Depending on the situation, it may be to your advantage to use the MicroStation Element Selection tools to have more discreet control over the text you're selecting for alignment.

With the text now rotated appropriately, you'll now begin the process of moving your text to the edges of the plan view. For this, we will be using the Align Elements by Edge tool which can be found either under the Main tools, or has been included as part of the Annotation Text task for convenience. To use this tool, first select the annotations you'd like to move either to the top or the bottom.

This tool will work with multiple items selected, so it is very easy to adjust the alignment of numerous annotations at once. Using the MicroStation Element Selection tools, select some of your annotations to one side of the alignment. As shown in the following illustration, you'll see that elements below the alignment have been selected. For the Align Edges tool in this instance, you'll want to have the Align option set to bottom and then when prompted, select the top gridline of the profile which will align all the text to it.

For elements above the alignment, the same procedure is used, however the Align should be set to top and the top edge of the border should be selected to align those items to that element. As this only pushes the annotations to the edge of the sheet, overlap is still an issue and additional clean up may be needed to separate annotations that are overlapping.
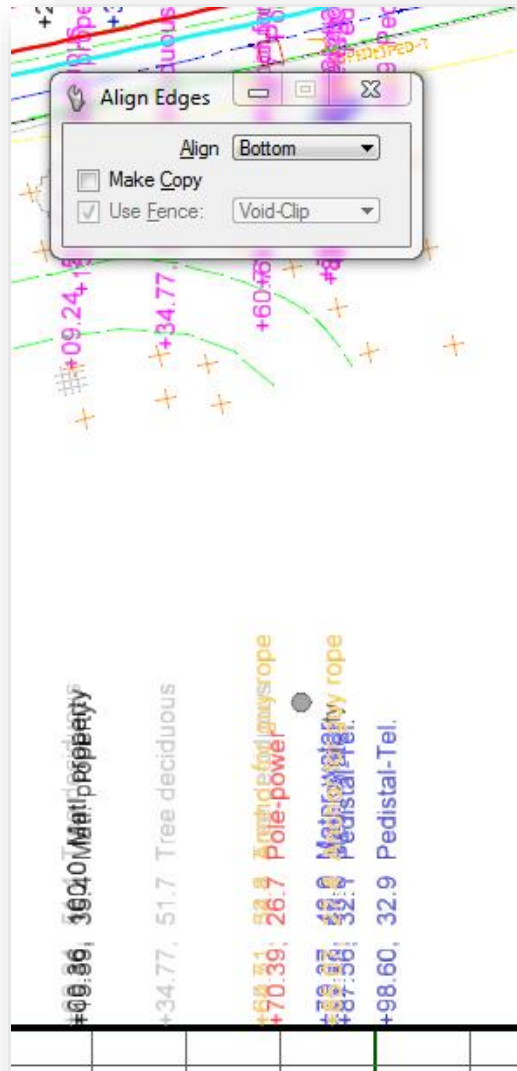
**Align Edges**

## 7.7 Additional Sheet Types

You can create a wide variety of sheets from the InRoads Plan Profile Generator. The process you've stepped through for the Plan Profile sheets can be applied to these other sheet types such as Bridge Layouts, Large Plan sheets, and Double Plan sheets; all of which have preferences created for their setups.

Be aware that the Station Offset annotation procedure that you've examined will not work properly when annotating double plan sheets as the sheet rotation is not the same. In this instance, you will need to create an intermediary text drawing and annotate the features in that file instead of directly on the sheet. This procedure is identical to that which we performed previously, however both the base drawing and the frames must be referenced to achieve the appropriate text alignment.

## 7.8     Adding Other Base Drawings to Sheets

Other base drawings such as Existing Right of Way can be added to InRoads created sheets such as Plan Profiles, Layout sheets, etc. The user must first obtain right of way drawings from whatever sources are available. For most projects, the existing right of way information will come from Route Survey Plat drawings and these should exist in the same coordinate system for any new projects and will line up automatically. (These are provided by your Surveyor). Other sources may include CAD drawings from Real Estate consultants (following complete abstracting and title searches). Throughout this section, Existing Right of Way drawings are referenced as being created. The same processes work for adding any additional information to the sheets.

Depending on your surveyor, it is entirely possible that you may receive your Existing Right of Way in InRoads native surface features or as alignments. Be aware you may still have to graphically convert either of these data types into the other for the purpose of cross section display (Right of Way must be a surface feature if you wish for it to display on cross sections).

### 7.8-1   Combine multiple drawings into one base drawing

If you have more than one existing right of way drawing for your project, you will want to combine all of the drawings into one. Reference the drawings into each other. If the drawings do not line up automatically, you will need to move the files based on corresponding coordinates present in both drawings. Next copy the reference files into the base drawing. Repeat procedure if you have multiple files to copy in.

When you have completed the above steps, the desired result is one combined existing right of way drawing.

### 7.8-2   Move to same coordinates system as Prplan.dgn

In order for the combined existing right of way drawing to be used in the plan profile sheets, the elements must exist in the same coordinate system. To accommodate this, you will reference in the Prplan drawing. If the drawings do not line up automatically, you will need to move the files based on corresponding coordinates present in both drawings.

The resulting existing right of way drawing is now ready to be added into other proposed drawings.

### 7.8-3   Graphically Importing Existing Right of Way

As the procedures necessary vary depending on the source of your Right of Way data, you will examine a few of the more common methods for importing this data and working with it in InRoads and making it available to others.

Data which is graphical in nature can be converted to a format InRoads will interact with. MicroStation, AutoCAD, and DXF files are all supported for this process. Utilizing the File import tools available allows vector graphics data to be converted to geometry or surface features. Often-times the largest barrier to conversion is the sheer volume of data in the CAD file provided. Disseminating the contents requires patience and organization.

In both instances, be aware that the element must be drawn up graphically, as there is no direct translation method from Surface Features to Geometry Alignments.

Using an existing CAD file provided by either Survey or a Consultant, you will convert the vector graphics representing Right of Way elements to InRoads Geometry.  If data provider is an INDOT employee, then the file is accessible through ProjectWise from the design folder structure.  Files provided by external consultants can be imported to a convenient location in ProjectWise by dragging and dropping. Select no wizard for the creation option.

First you need to reference and possibly merge your data into our base drawing (alignments can be imported from reference elements).  Attach your file using either the *MicroStation -> File -> References* menu item or by the Reference toolbar button.  With the references dialog open, attach the file containing your right of way.  This may be the LCRS Plat provided by survey or another file provided by a consultant.   Note that the file you attach may have additional data displayed that you do not wish to import.  Should this be the case, you can use your level display to disable the levels of features you don't wish to display.

At this point you will no doubt recognize the Right of way elements in the drawing.  Elements can be converted to InRoads Geometry. Careful inspections of right of way elements may show elements that have been constructed, segmented, and are not joined.  For convenience in later operations, you may wish to join them to be continuous.  To join these elements using MicroStation, use the Create Complex Chain tool.   Create Complex Chain will generate a new chain from the selected elements on the active MicroStation level.  Because you don't want the level of the element to change, first match the attributes of the element you are chaining.
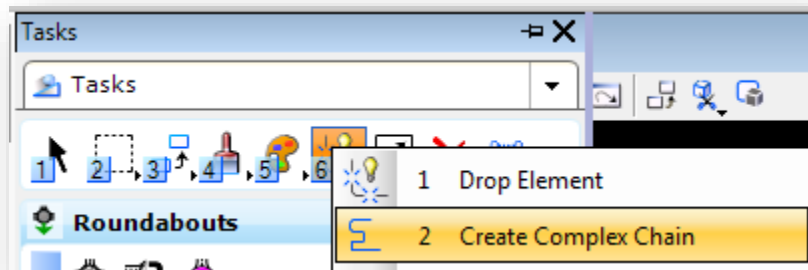


Create Complex Chain

Selection of elements is possible utilizing Element Selection or Select by Element Attributes.  Note: the element selection window using selections around elements is suggested.  Alternately the "select all" (world icon) will add all elements to selection sets (even levels turned off).  Elements may be converted one at a time, however for speed of conversion, you will convert by level.  Different data may require various methods.

With your elements selected, you can now import them into Geometry features.  For this, you will use the *File -> Import -> Geometry* menu item on the InRoads Explorer.  On this panel, you will want to define settings similar to the following illustration.  Of particular note, notice the Style selected, and make sure that you use good naming so each feature you include is clear.
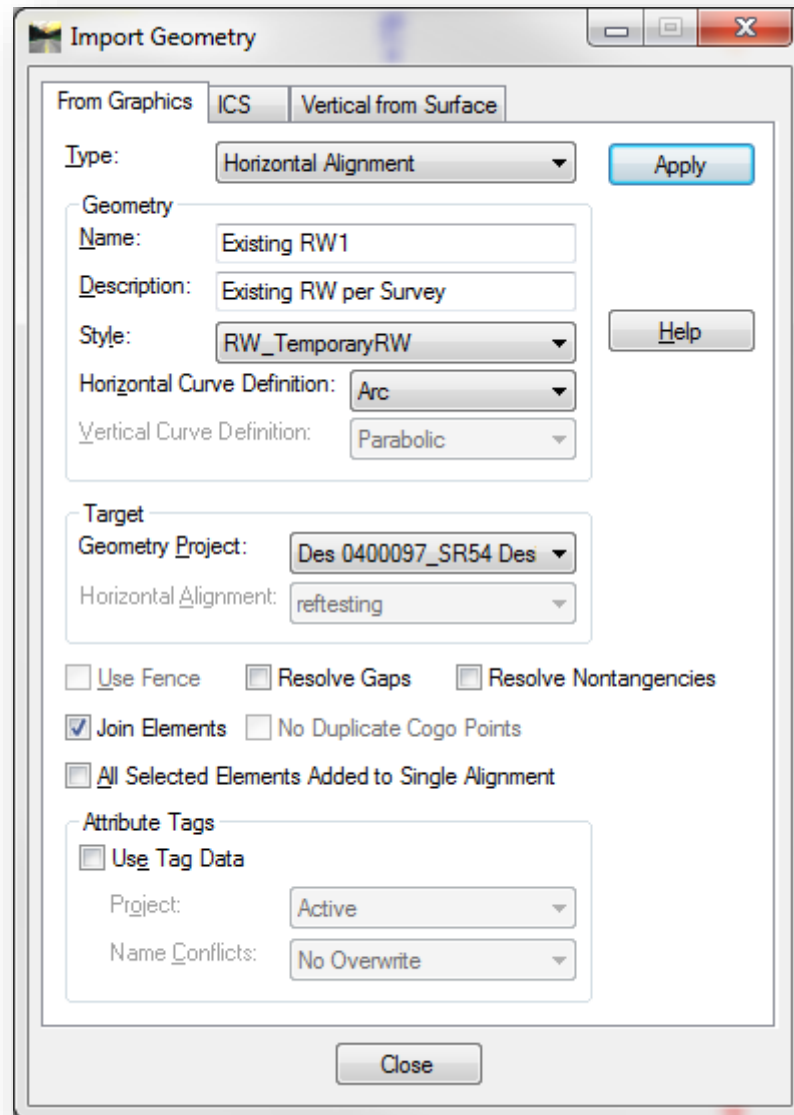
**Import Geometry**

With your settings configured, you can now select Apply to begin the import.  During the import process, InRoads will enumerate the name of the alignments, should you have more than one distinct item selected (Existing RW1, Existing RW2, RW3... etc.).  At this time, you can either delete any graphics merged in from the references or detach your referenced file depending on the method used.  Then, you can redisplay the alignments from InRoads Geometry menu.

### 7.8-3b      Importing to a Surface

Again, you will be starting with existing data provided in the same manner as the Geometry import. As such, the steps preceding the actual import process are the same.

With the data prepared, you can now look at importing the graphics into Surface Features. This time, you'll use the *File -> Import -> Surface* menu item on the InRoads Explorer. On this panel, you will want to define settings similar to the following illustration. Here you have a few more options that require adjustment than in the Geometry panel.

First, you need to define where you'd like your new features to be created. As you can add the new features to existing cross sections, you'll create a new DTM names Des XXXXXX_SRXX Existing RW.dtm. With this defined, you need to determine what you're loading the data from; particularly for internal data you'll be able to use the Level option, as any existing RW should be on the RW_ExistingRW level. This could vary however, depending on the source of your data and could possibly require that you potentially use the Single Element or Fence options.

Next, you need to determine how the elevations of the RW lines will be determined, which will influence their display on the cross sections. To adjust these appropriately, make sure your Elevations are set to Drape Surface and that your Intercept Surface is set to your projects Survey Surface. This will drape the feature over the existing triangulation and display the features properly on the cross sections.

Finally, you need to define the style these features should be imported as. As you can see, you've defined our import to use a seed name of RW. Place the imported features into the RW_TemporaryRW style with a point type of Breakline which is being excluded from the triangulation.

With these settings, you can go ahead and select Apply and the features will be created in a new DTM. Make sure you save this DTM back to ProjectWise so it's available later when you'd like to display the Right of Way features on your cross sections.
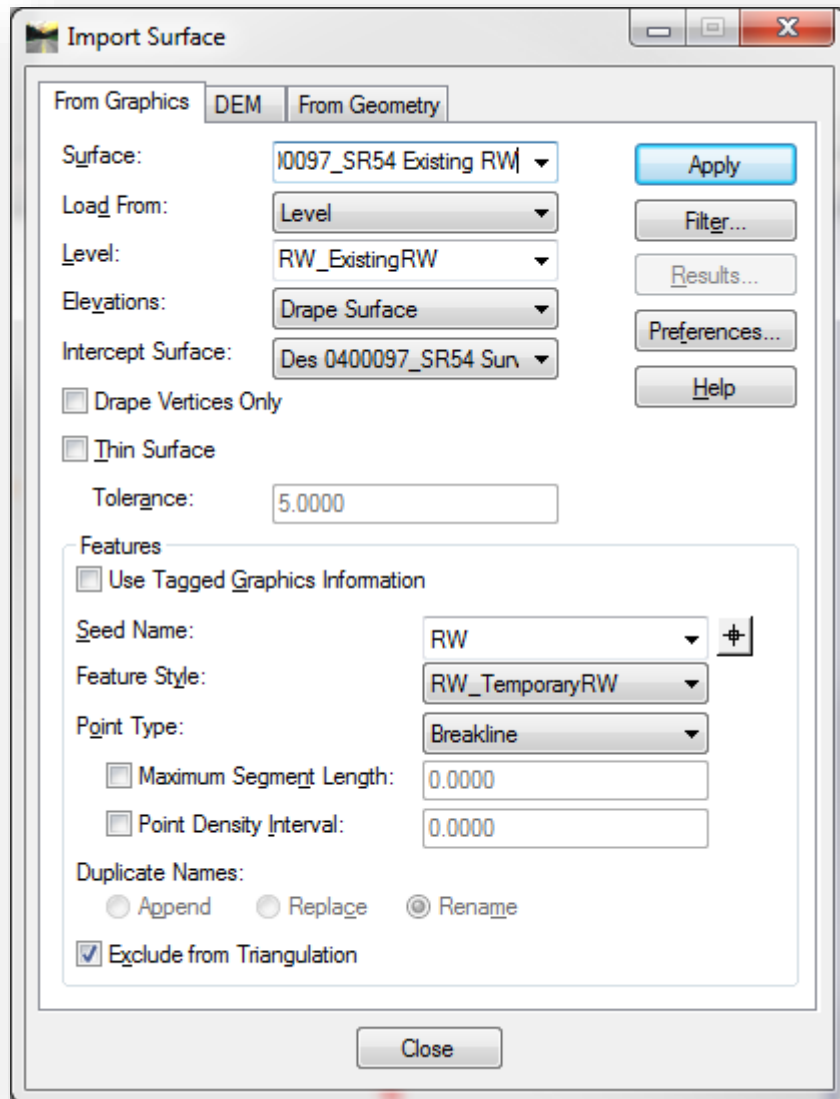
Import Surface

## 7.9 Cross Sections

With InRoads, both existing and proposed cross sections are created and modified through the use of the Cross Section tools found under the *Evaluation -> Cross Section -> Cross Sections...* menu item on the InRoads Explorer.  Note that should a substantial number of Cross Sections be created, it's recommended that these be created in a new DGN to help increase performance when working of out of a base drawing.

### 7.9-1 Cross Section DGN

InRoads cuts cross sections one of two ways; either in a horizontal row in your currently active model, or into individual sheets in your currently active DGN.  Included in the new InterPlot set files for plotting, both methods are supported for final output; however, from a workflow perspective it's

recommended to cut sections to the current DGN/model throughout the development process and then cut your final sections to a new DGN in your project. While examining the following steps, you will be looking at them in the context of final cross sections. Using the following naming suggestions, create/open a DGN named for your proposed sections.

| Cross Section Drawings | | |
|---|---|---|
| *Drawing Names* | *Descriptions* | *Examples* |
| exSections_LineA | Existing Sections along Line "A" | exSections_LineA.dgn |
| prSections_LineA | Proposed Sections along Line "A" | prSections_LineA.dgn |

Remember, prior to cutting your sections, you must adjust your Global Scale Factors to match the scale of the preference you select. (I.E. if you use the 10 scale cross section preference, all your global scale factor values should also be set to 10.) If you leave your global scale factors at a different value, you will have issues with linestyle and text scaling.

### 7.9-2   Surface Properties

Prior to creating your Cross Sections however, we do need to make some adjustments to our surfaces so they display appropriately in section view. First, we'll set our existing surface to the appropriate style. To do this, right click on your Survey Surface in the InRoads Explorer.
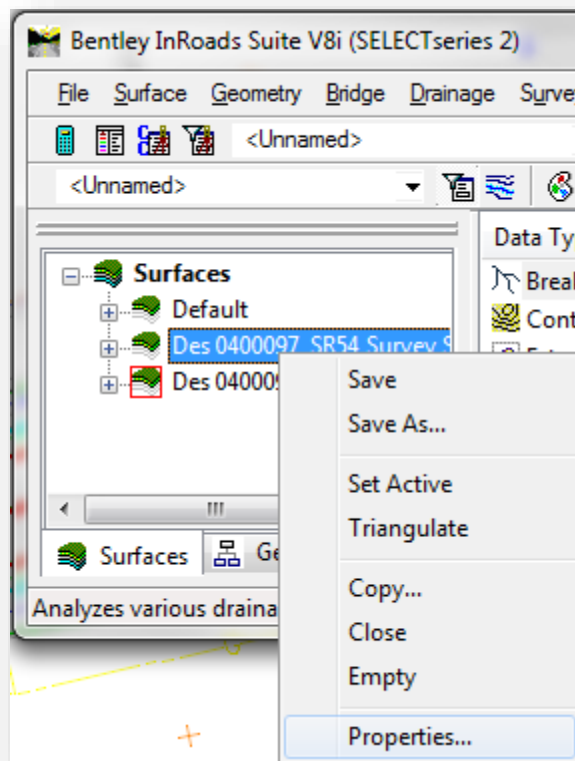


Surface Properties

As you did with the Profile settings earlier, go to the Advanced tab of the Surface Properties dialog, this time concerning ourselves with the Cross Section area of the dialog. For this, you'd like to set the Symbology area to XS_TC_Existing.
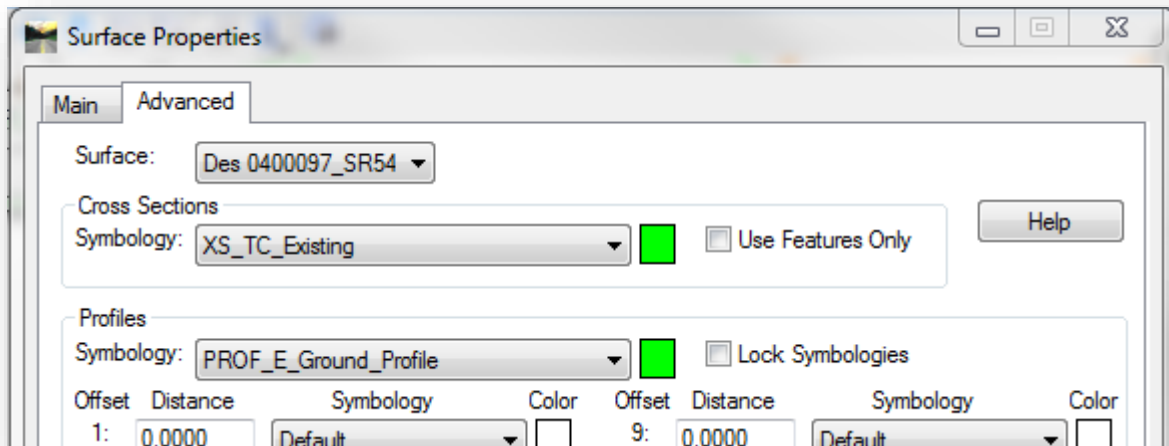


Cross Section Symbology

For your proposed surface, you will perform the same steps only setting your Symbology to XS_TC_Design.

### 7.9-3    Cross Section Creation

With the surface symbologies now appropriately configured, you can start the Cross Section tools from *Evaluation -> Cross Section -> Cross Sections....*  These tools will be used for the creation, modification and updating of both existing and proposed Cross Sections.

#### 7.9-3a        Cross Section Preferences

Like other InRoads tools, INDOT customized preferences are available for use with Cross Sections. These preferences do have one major difference in function, in addition to the usual scaling differences. For each scale, there is a regular version and a "Sheets" version. When using the regular preference, all cross sections will be placed in a horizontal row in the currently active model in your DGN file. If the "Sheet" version is selected, each Cross Section sheet will be placed in its own model in the active DGN. For the purposes of the following examples, you'll look at the settings used in the IN PW XSec 10 Scale Sheets preference. Be aware that when cutting directly to the DGN, you will be recreating a new section set each time. When cutting to Models, previous versions of the sections will be deleted if a new name is not selected.

#### 7.9-3b        The General Leaf

With the 10 Scale preference loaded, you'll examine many of the settings that are pre-configured for use in this scale. First, look at the General Leaf.

The General Tab contains settings such as the Section Set Name, what features should be created, the interval between sections, the left/right offsets, the vertical exaggeration and what surfaces are displayed. These settings are preset via the use of the Preference, except the Set Name, and the

Surfaces included.   The Set Name can be set one of two ways, the first being it assumes the name of the active Horizontal Alignment set via the Source leaf or it can be keyed in directly.  The surface enabled will coincide with the active Surface, as well as allowing you to pick any additional surfaces. For existing sections, you would only select your survey surface.  For proposed cross sections, you would select both your survey and proposed sections.
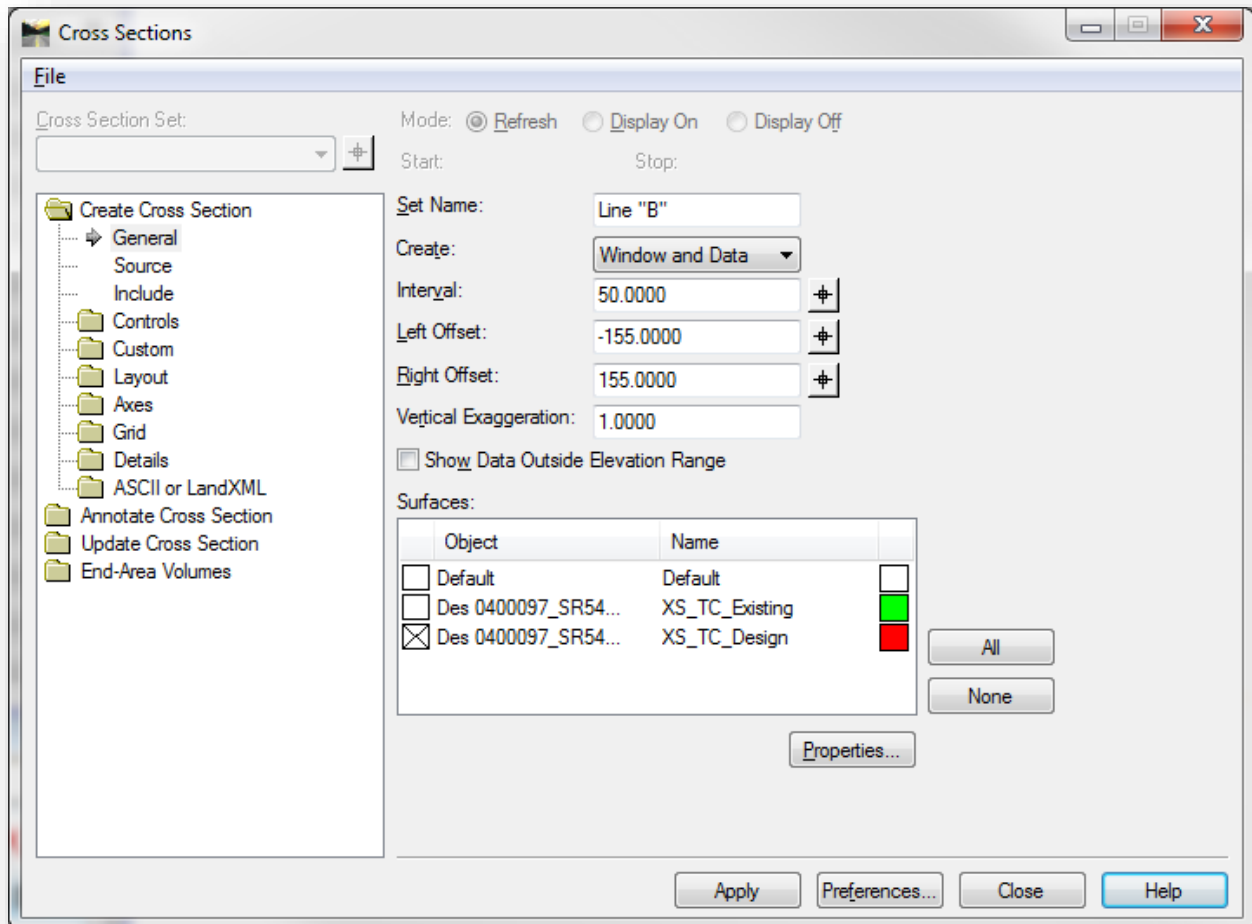


**Cross Sections – General Leaf**

### 7.9-3c    *The Source Leaf*

The Source leaf allows you to select the item you'd like to use to cut your sections along.  Of the methods available, the most often used will be a horizontal alignment in your ALG file.  You could also use any linear graphic element, a multipoint selection of points, or a coordinate list provided via text file or LandXML.  In the following example, you'll see that a Horizontal Alignment, Line "B", has been selected.  This would also reset the Set Name to the same name as the alignment selected.
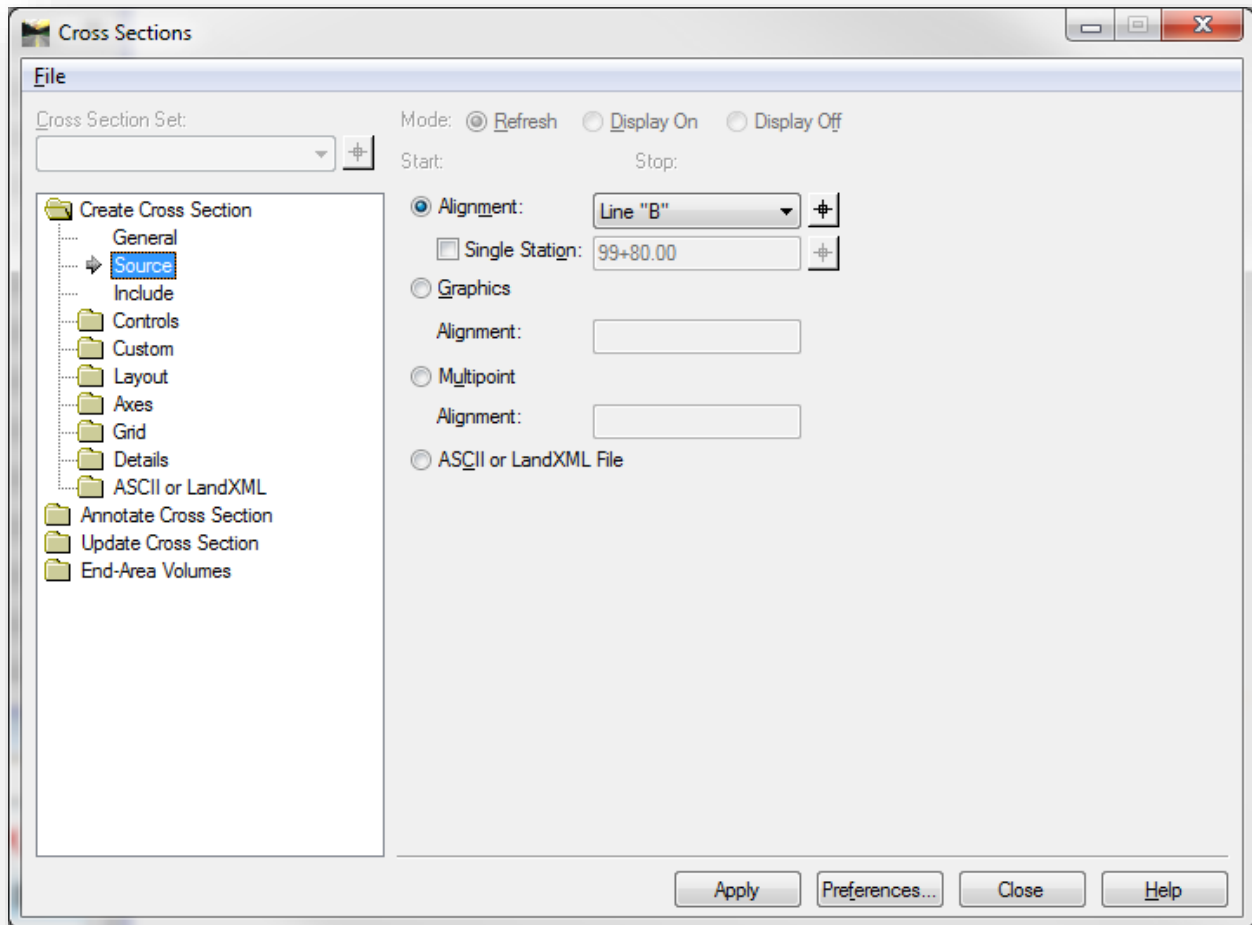
The Source Leaf

### 7.9-3d    The Include Leaf

The features on this leaf are used in the event you wish to show crossing surface features, or those that are from the InRoads Storm and Sanitary utilities.  As defined in the preference, features such as guardrails, Obstruction Free Zones, Right of Way, and some drainage structures will be displayed as crossing features on your section.
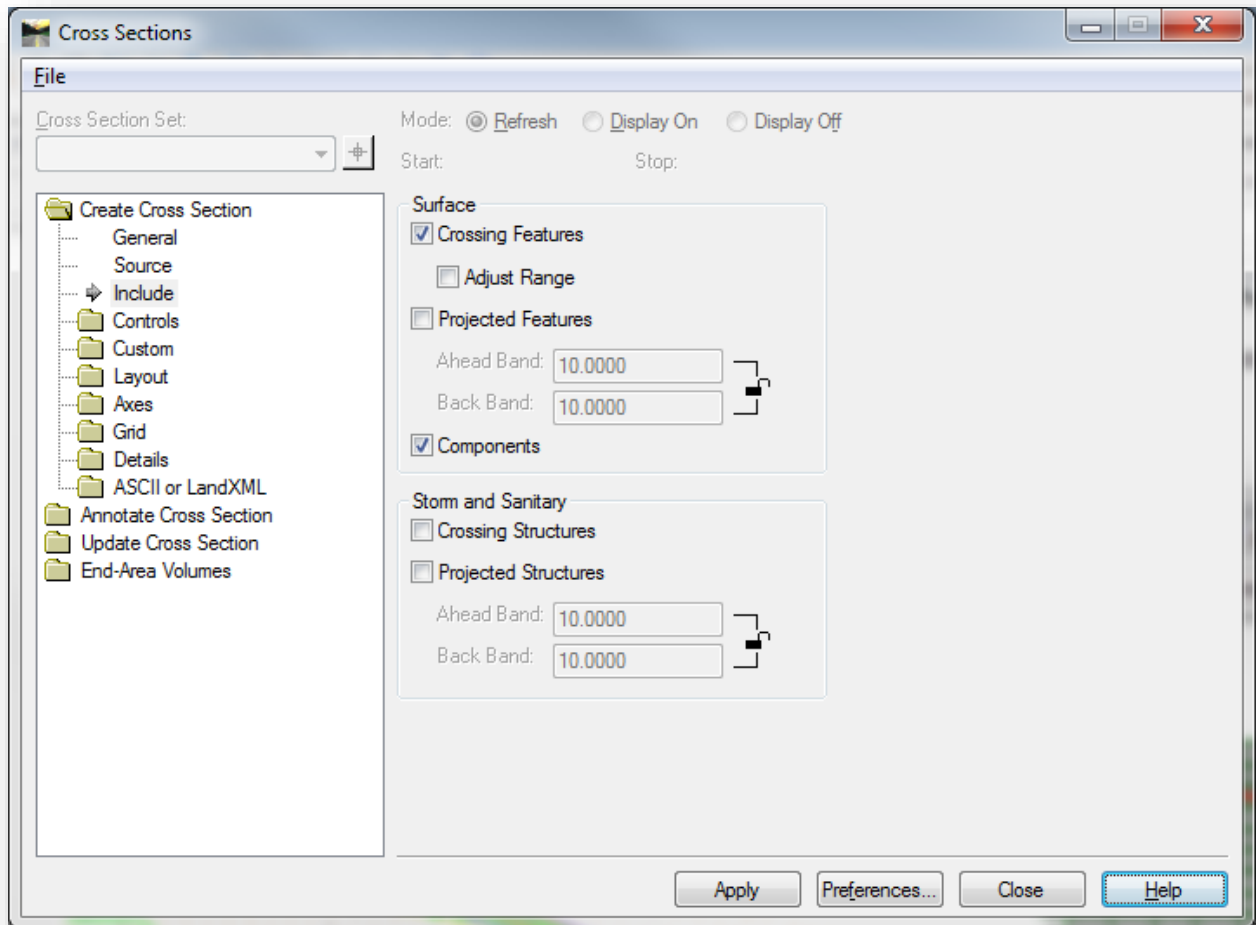
**The Include Leaf**

In addition to showing crossing features, this tool can also interpret and display projected features that, while not at your current section, may be within a band defined by the Ahead and Back Band dialogs. These give you the flexibility to show items either before or after the current station's section based on a distance you define. The Components toggle specifies how components from Roadway Designer are displayed when showing your proposed sections. While enabled, each pavement layer or component you have in your template will be displayed as their individual features in the cross section.
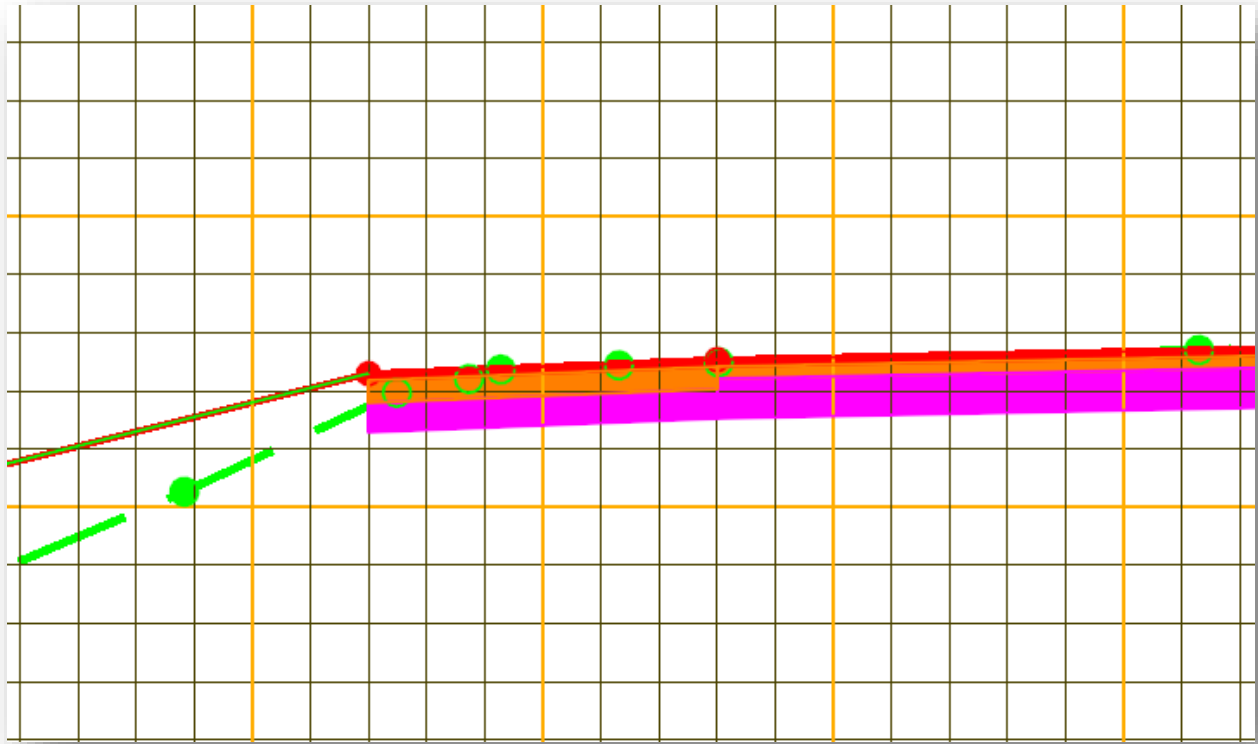
**Cross Sections with Components Enabled.**

In the previous illustration, you can see the proposed design with the components enabled. For these features to be filled in, you must enable Fill in your MicroStation View Attributes.

As with the surface features, the Storm and Sanitary features behave in the same way in regards to selection and the banding for projected features.

### 7.9-3e    The Controls Leaf

The items in the Controls Leaf allow us to define the station range of the sections. The default is for the entire length of the selected alignment. In addition to this, the Critical Sections sub-item allows for the creation of sections at a series of pre-defined InRoads points.

Should you need to display the section cut lines in the plan view, navigate to the Plan Display option and enable the Planimetric and Planimetric Stations options as shown:
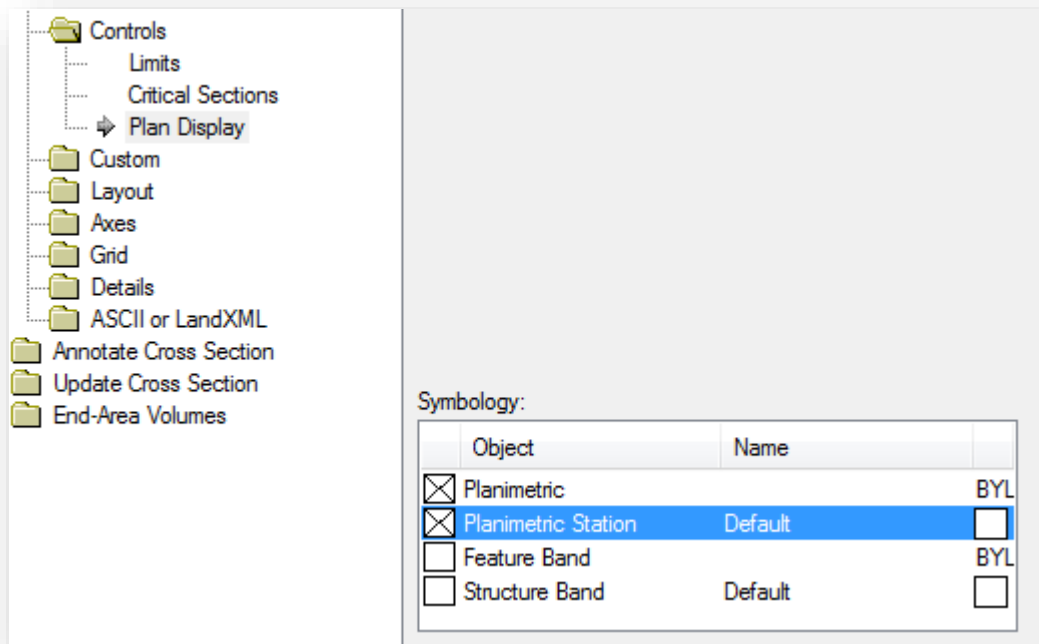
**Plan View Section Items**

### 7.9-3f    The Custom Leaf

The Custom tools allow for the definition of custom section ranges within your section set as a whole. For instance, you can define a station range within your set that has a smaller interval, or instead of being perpendicular to the alignment, is skewed with different offsets should you need to include more information.  For these custom sections, you can also define whether or not crossing and projected features are included, independently of the full set definition.

### 7.9-3g    Everything Else

The remaining items under the Create Cross Section Leaf are all predefined using INDOT standard values for sheet borders, grid values, etc.  In most instances, these values can be left as is, as they come in from the appropriate preference.  With all the settings defined, select Apply and InRoads will create the Cross Sections using the settings you've defined throughout this example.

### 7.9-4   Cross Section Annotation

With a section set created, you'll now look at the annotation process.  As you may have noticed in the previous section, there are additional leaves on the dialog from *Evaluation -> Cross Section -> Cross Sections….*  This time, navigate to the Annotate Cross Section Leaf.

The first thing you should notice when activating this leaf is the Cross Section Set: option becomes active.
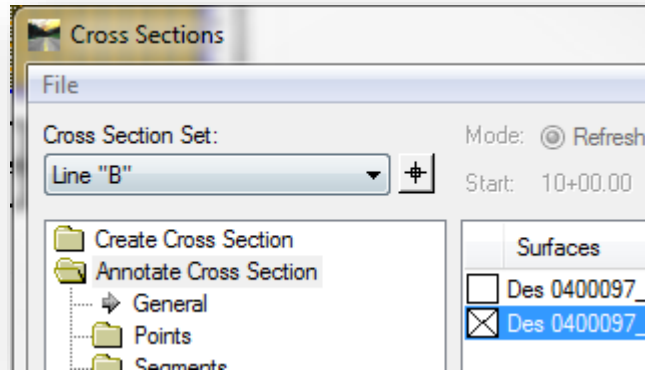
**Cross Section Set Active**

In the instance that the DGN has multiple section sets defined, this will allow you to specify which section set you'd like to interact with. In most cases, you'll only need to select the surface you'd like to annotate, along with the corresponding Preference. This will appropriately define all the remaining features in the Annotate Cross Section tree. When you're satisfied with the setup, select Apply, and the annotation selected will be placed on your sections.

### 7.9-5   Update Cross Sections

Unlike MX, InRoads allows for the modification of Cross Sections once they're created, as opposed to recreating a new section set. Under the Update Cross Section leaf, you'll briefly examine the options available and how they function in regard to adding or removing items from your sections.

Like the Annotate Cross Section leaf above, the Cross Section Set: is enabled when you select this leaf, however you also have the Mode: picker activated as well.
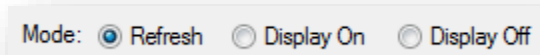


**Update Cross Section Mode**

These modes control the context of what surfaces or features are shown when you select the various functions. To better explain, during the initial section set creation, you displayed both the Survey Surface and Design Surface. If you navigate to the Surfaces leaf with the Mode set to Refresh, you'll see both surfaces listed. If you switch the Mode to Display Off, both are still displayed, but this time you'll select the Proposed Design surface and select Apply. At this time, you'll see the Proposed Design disappear and only show again if you go to the Display On Mode.

Using these Modes, you can add, remove or adjust the surfaces and features you have displayed in an existing cross section set, allowing a far higher degree of flexibility when working with these.

In addition, you can also adjust Crossing and Projected features, and station range.

### 7.9-6　End Area Volumes

To get End-Area Volumes displayed on the sections, you'll look at this feature's leaf in the Cross Sections tree.

Currently, this tool is configured to place this annotation below each related section.  Along with your other cross section tools, you do have appropriately scaled preferences.  For this example, you'll be placing the annotation using the EndAreaVolume10scale.  With this Preference, all other items will be appropriately configured per INDOT standards.  When ready, select Apply, and the annotations will be placed.
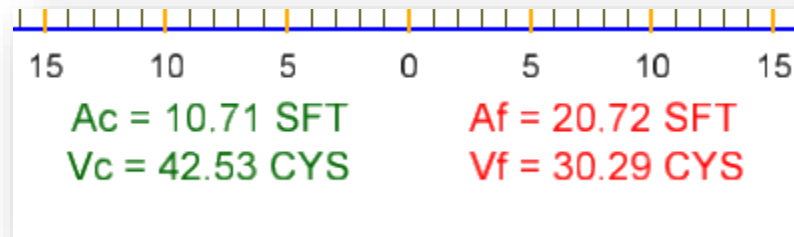


<div align="center">End-Area Volumes</div>

### 7.9-7　Benching Area Volumes

As the InRoads cross section annotation tools do not allow for the placement of the Benching Area and Volumes, the following process is recommended:

1. Select the Cut Area and Volume with the Power Selector.
2. Select the Copy tool for the Task Navigator.
3. Using the center snap mode, snap to the center of the Fill Volume and then drag to the left, and again center snap to the Cut Volume.  This will ensure consistent spacing between all text as shown:
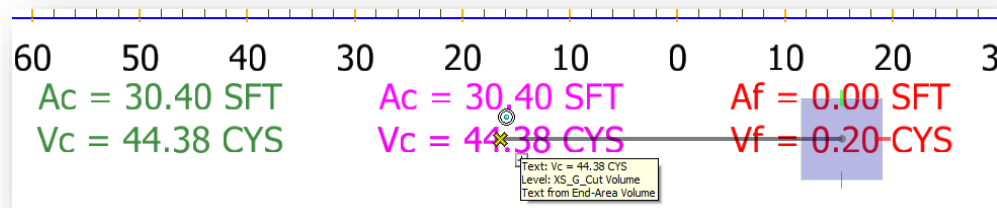


4. The newly copied text should be modified so it's on the level XS_G_Benching Area and XS_G_Benching Volume respectively.

### 7.9-8　Cross Section Notes

1. When creating sections, make sure you set your Global Scale Factors to match the scale of the Preference you've selected.

2. Be careful when working with the sections once they're created.  Deleting or modifying parts of the sections can cause InRoads to lose the ability to identify and Annotate/Update your sections.
3. ProjectWise title block integration is enabled on these sheets and is immediately available if you create the sections in a DGN opened from ProjectWise.  A new DGN that has not been checked in will display the placeholder tags until the file is checked in and re-opened.
4. When cross section components are displayed, these are closed shapes that can be measured for area at the scale drawn.
5. When annotating, make sure to use Pen Mode and Delete Ink Lock to prevent annotations from being lost during additional runs of the Update/Annotate Sections commands.

### 7.9-9    Other Cross Section Functions

#### 7.9-9a        Cross Section Reporting

Unlike most reporting tools in InRoads, Cross Section Reports can be found with their corresponding toolset instead of under Tools -> XML Reports on the InRoads Explorer.  These reports can instead be found under Evaluation -> Cross Section -> Cross Section Report.  Once in the report tool, select your relevant surface(s) and select Apply.
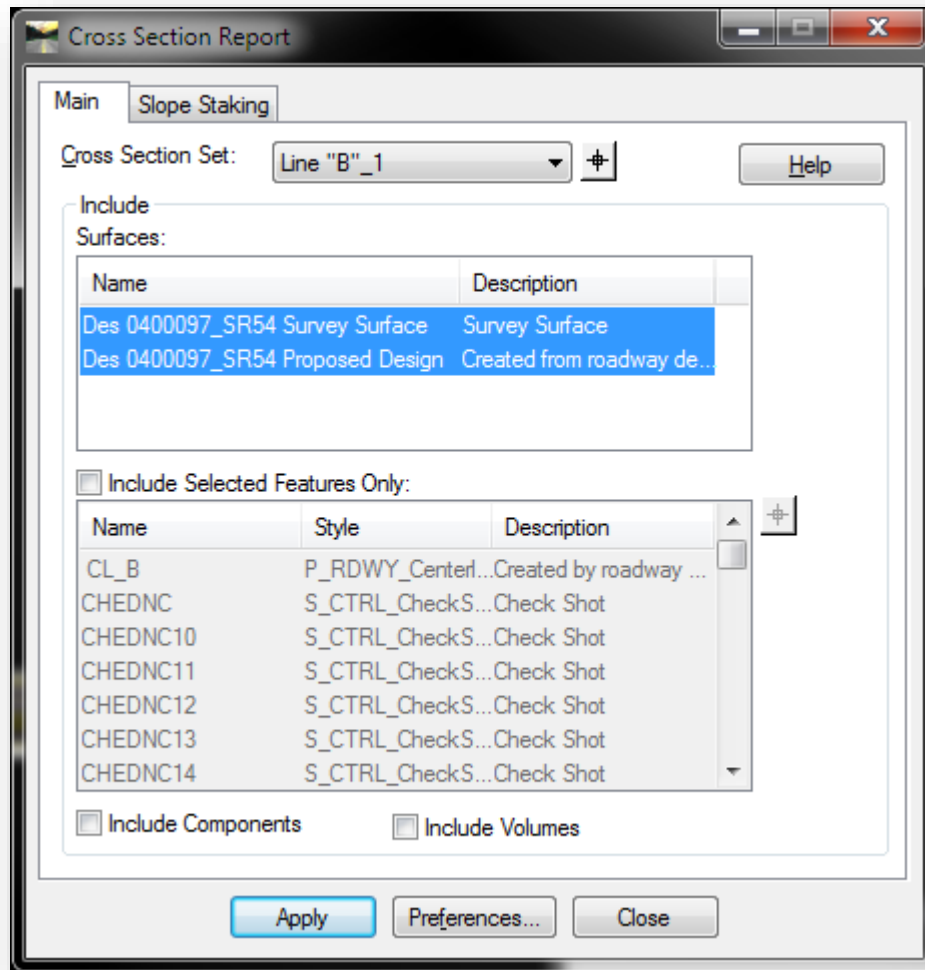
**Cross Section Report**

On the report browser, the particular reports of interest will be under the Evaluation folder, and are CrossSectionPoints.xsl and CrossSectionPointList.xsl.

### 7.9-9b    Cross Section Troubleshooting

During the process of Cross Section creation, one of the most common issues is an error that specifies a section is out of range.  This is most commonly caused by a section that is cutting through a surface that has triangulated features that are located at 0 elevations.  In this instance, you might want to cut the sections without sheet borders in order to locate the item in question.

To cut sections without sheet borders navigate to the Layout leaf on the Cross Sections panel (Evaluation -> Cross Section -> Cross Section).  Under Layout, select General.  On this tab, select Stacked for the Mode.
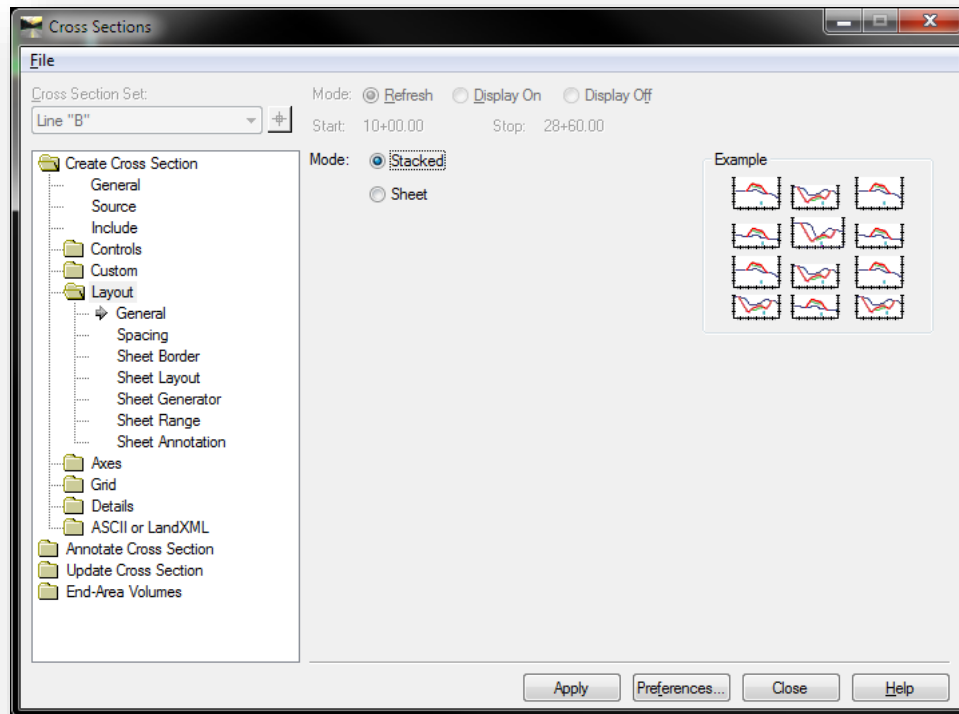
**Cross Section Layout**

This will allow InRoads to create all specified sections without limits on the horizontal extents and allow for the inspection of sections to locate the area where the triangulation may be an issue.

### 7.9-10  InRoads RW Modeling and Cross Section Tips (courtesy H. Brown)

#### 7.9-10a     Steps to Model Right-of-Way in InRoads Using Cogo Points:

1. Open the InRoads Geometry Project that will be used to store R/W Cogo Points and R/W alignments.
2. Create a Cogo Point for each R/W point using Geometry/Cogo Points/New.  Select Station/Offset for the Define By field.  Enter the desired point number in the Name field.  For the Horizontal Alignment field, enter the alignment from which the R/W point is described. Enter the appropriate values in the Station and Offset fields.  Leave the Elevation field as 0.00. For the Style field, select RW_ProposedRW. Click Apply when finished.  (Note: Example is for Permanent R/W on left side for US 231, Des. No. 0800856.  See attached plan sheets.)

3. For parallel R/W on curves, three points should be created at the following locations: beginning of parallel R/W on curve, curve center, and end of parallel R/W on curve. The same curve center point can be used for multiple arcs on the same curve.

4. After Cogo Points are created, they can be edited if needed using Geometry/Cogo Points/Edit.

5. After the Cogo Points have been created, create the alignment using Geometry/Utilities/Create Edit Alignment by Cogo Points. *Enter the appropriate Alignment Name and Description in the Name and Description fields.  It's recommended that a new alignment name be used in the Name field to prevent the accidental overwriting of an existing alignment.*  Use the style RW_ProposedRW (for permanent R/W) or RW_TemporaryRW (for temporary R/W).  In the Alignment Definition field, enter each point number separated by a space. For a point that represents a curve center, use the prefix "c" and suffix "l" (curve to the left) or "r" (curve to the right).  In this example, point number 303 is the curve center for a curve to the right (Station = 449+26.05, Offset = 1432.44').  Click Apply when finished.

**Create/Edit Alignment...**

Name: `RW Permanent Lt 01` ▼ ⊕ **Apply**

Description: `RW Permanent Lt 01` **Close**

Style: `RW_ProposedRW` ▼ **Help**

`RW_ProposedRW`

Alignment Definition:

```
300 301 311 302 C303R 309 310 C303R 312 308 C303R
304 305 306
```

**Clear**

Graphical Input

**Start** **Stop**

**Center Point Left** **Point** **Center Point Right**

**Curve Midpoint** **Spiral PI**
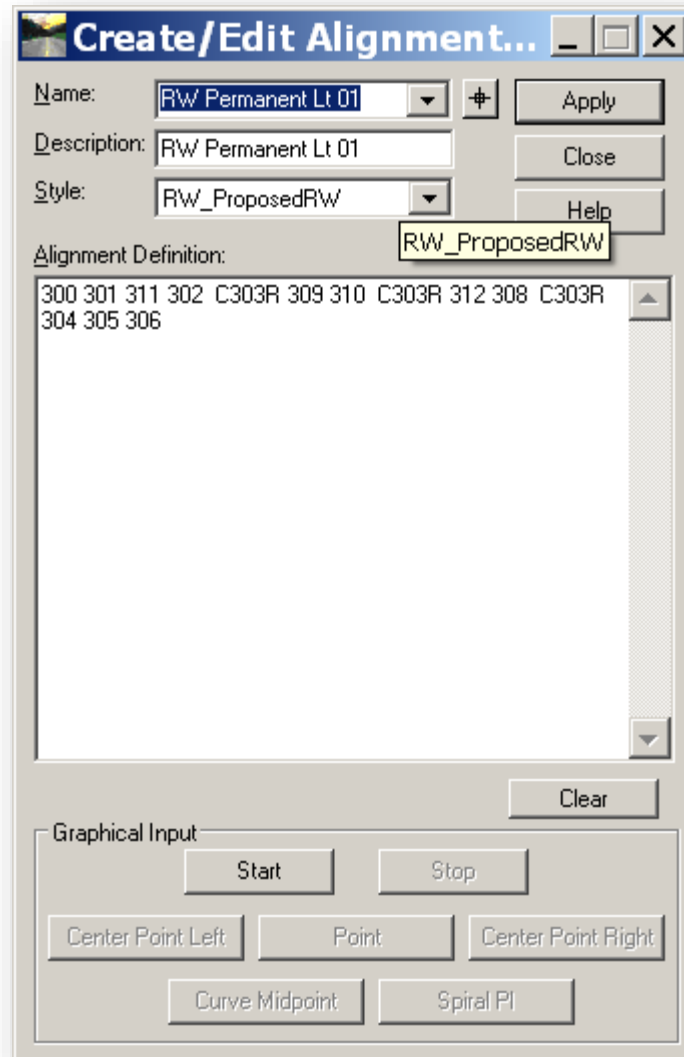
6. After the R/W Alignment is created, points can be added to or removed from the R/W alignment using Geometry/Utilities/Create Edit Alignment by Cogo Points.

7. Individual points can be edited after the alignment is created (refer to Step 4). The alignment will automatically be updated when a point on the alignment is edited. To edit points that are part of an arc for parallel R/W on curves, change the Alignment Definition to remove the "c" prefix and "l" or "r" suffix and click Apply (refer to Step 5). After the arc points are edited, the "c" prefix and "l" or "r" suffix should then be added again to the alignment description.

8. The R/W alignments can be drawn in plan view using Geometry/View Geometry/Active Horizontal. All horizontal alignments in a Geometry Project can be drawn using Geometry/View Geometry/All Horizontals. The linestyles can be changed using MicroStation commands.

9. To show R/W on cross sections, R/W surface features need to be created from the R/W Alignments. The features can be created using File/Import/Surface/From Geometry. Set the

Target Surface to the surface that will be used to store R/W features.  Check the Alignments radio button and use the Filter button (after clicking in the Alignment field) to select the alignments that will be used to create features.  The Geometry Selection Filter panel is shown below:
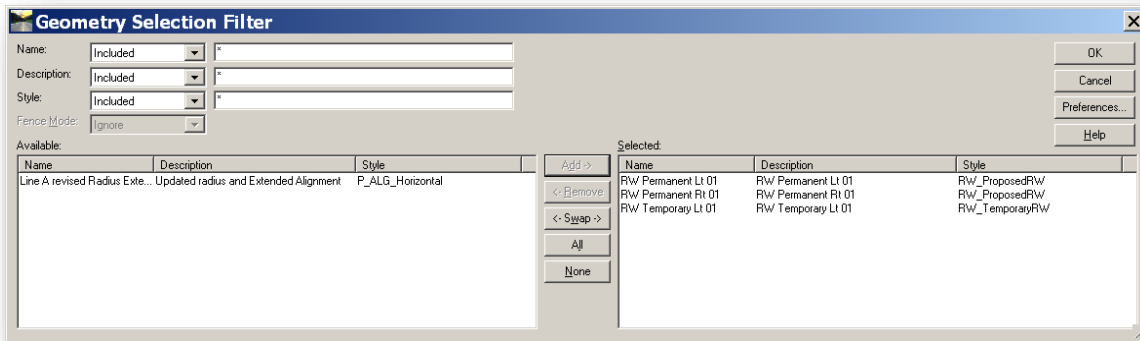


10. On the Import Surface panel, select the following settings in the Features section: Name = From Geometry, Type = Breakline, Point Density Interval = Value Selected by User (10.00 in this example), Duplicate Names = Rename, Exclude from Triangulation = unchecked. A lower Point Density Interval improves the accuracy of the elevations on the R/W features.  In the Elevation section, select Surface in the Source field and select the Surface used to generate the R/W feature elevations in the Surface field. Click Apply when finished.

**Import Surface**

From Graphics | DEM | From Geometry

Target Surface: Proposed RW

**Points/Alignments**
- ○ Points
- ● Alignments
  - Name:

Selected:
- RW Permanent Lt 01
- RW Permanent Rt 01
- RW Temporary Lt 01

Apply

Filter...

New Style...

Help

**Features**
- Name: ● From Geometry    ○ Specify
- Seed Name: geometry
- Style: Default
- Type: Breakline
- Point Density Interval: 10.0000
- Duplicate Names:
  - ○ Append    ○ Replace    ● Rename
- ☐ Exclude from Triangulation

**Elevation**
- Source: Surface
- Surface: Modified topo

Close

11. Check to ensure that the features have been created with the correct styles using Surface/Feature/Feature Properties.
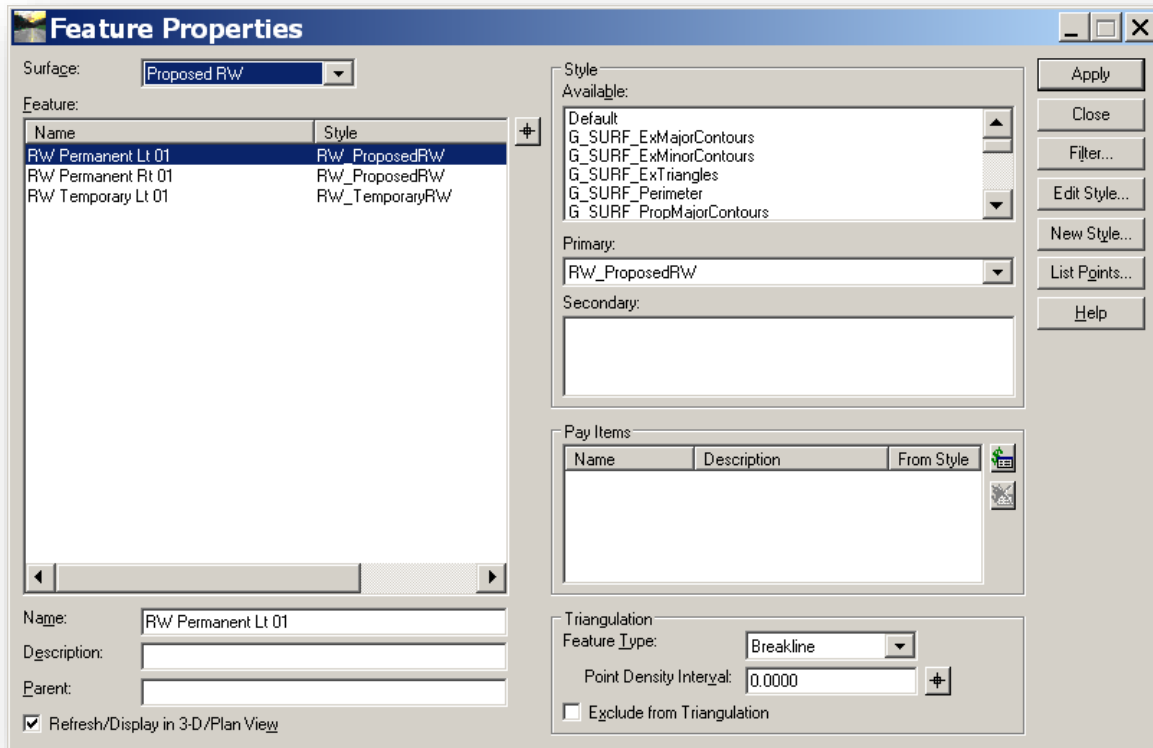
12. Triangulate the surface containing the right-of-way features using Surface/Triangulate Surface.

### 7.9-10b    Modeling Crossing Features on Cross Sections

The next two sections step through the process of modeling various crossing features on Cross Sections which is used to place a cell denoting horizontal position of various cross section features. These steps should be considered in any function where one would want to display items such as Right of Way, Guardrails, and Utilities.  Each includes a specific example but the process is the same for any of these features.

### 7.9-10c    Steps to Draw Points on Cross Sections as Cells:

*Note: The following steps have been already performed on the INDOT.XIN file located at* pw:\\dotwise.indot.in.gov:DOTWise\Documents\INDOT Workspace\InRoads\XIN\INDOT.xin.  *These steps are included as reference only.*

1. Named Symbology is used to define how cross section points are drawn.  A Named Symbology is associated with a Style.  If the Style does not already exist, create the Style using the Style Manager (Tools/Style Manager). The association between a Style and a Named Symbology is created using the Style Manager (Tools/Style Manager/Edit). In this example, we will use the existing Named Symbology XS_TC_Guardrail Left to draw the guardrail on the left side of the roadway.
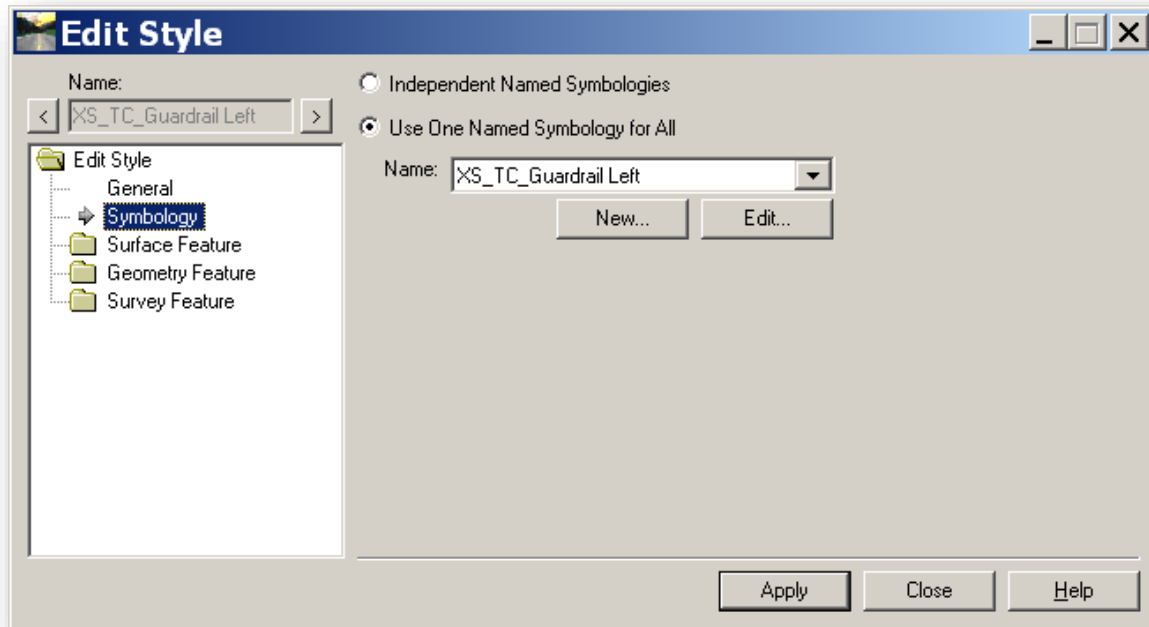
2. When creating cross sections, the features to be drawn should have the appropriate Style and Named Symbology assigned to it.  This can be checked using Surface/Feature Properties.
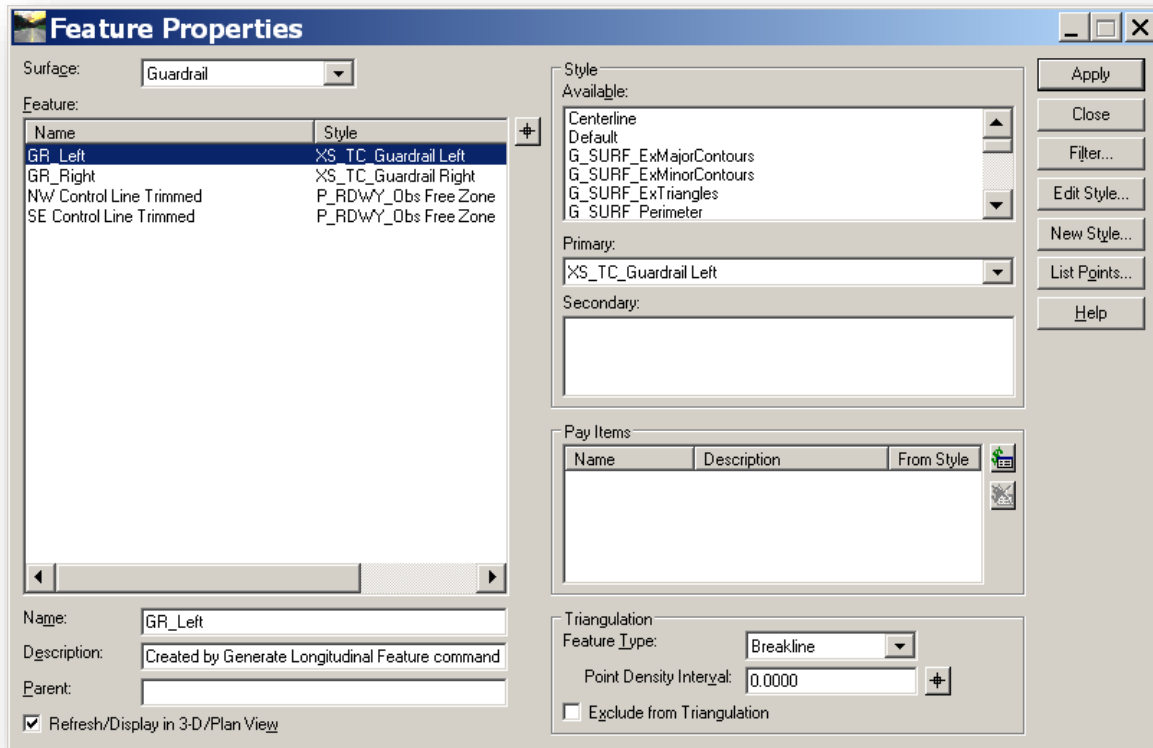
3. The Style should also have Crossing Points enabled. This can be checked using Tools/Style Manager/Edit.
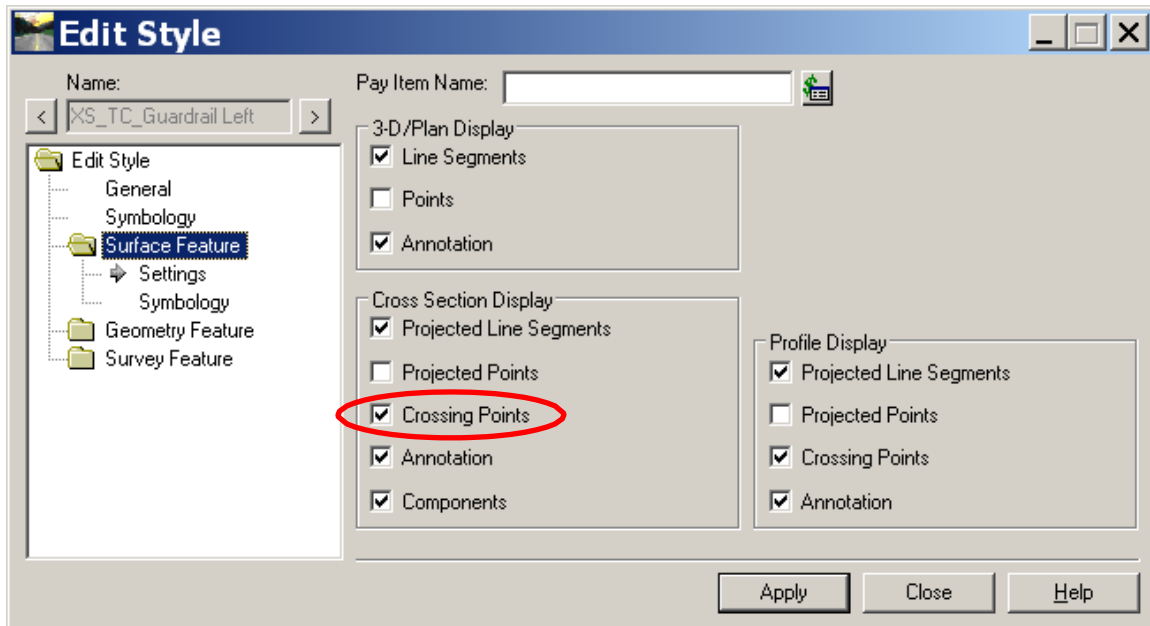


4. Open the Named Symbology Manager using Tools/Named Symbology Manager.

5. Highlight the Named Symbology that you would like to edit. You can also select New to create a new Named Symbology.
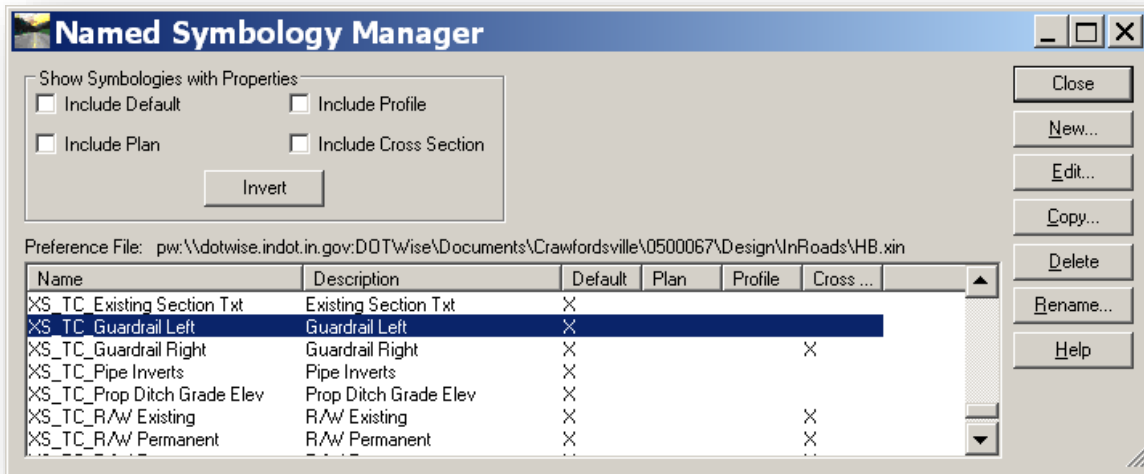


6. Click Edit. The Edit Named Symbology panel opens. Highlight Cross Section Point and click Edit.
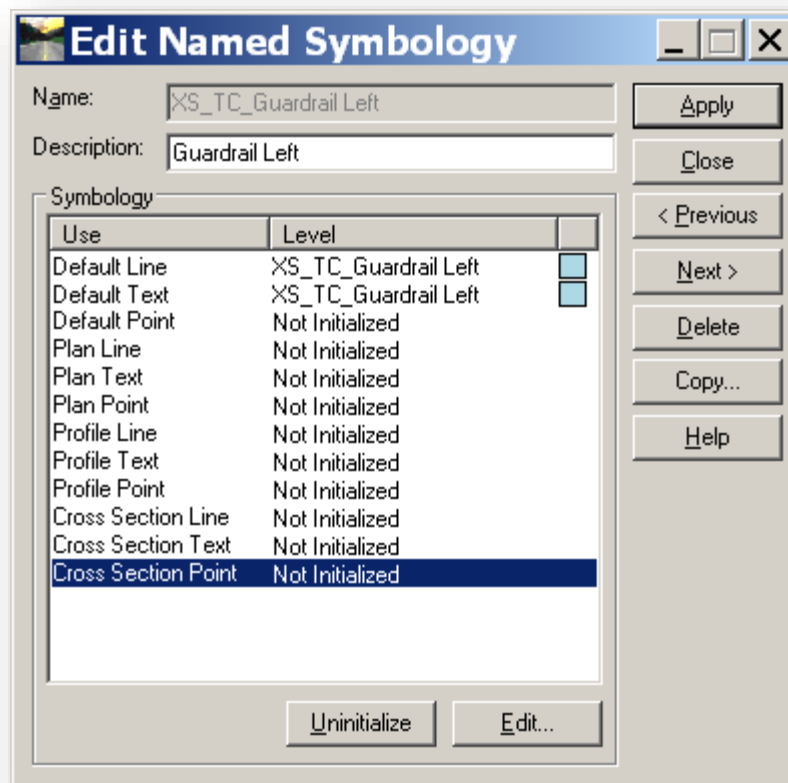
7. On the Point Symbology panel, first check Display under Symbol and select the desired color for the cell. Selecting the color is not available under the Cell option.
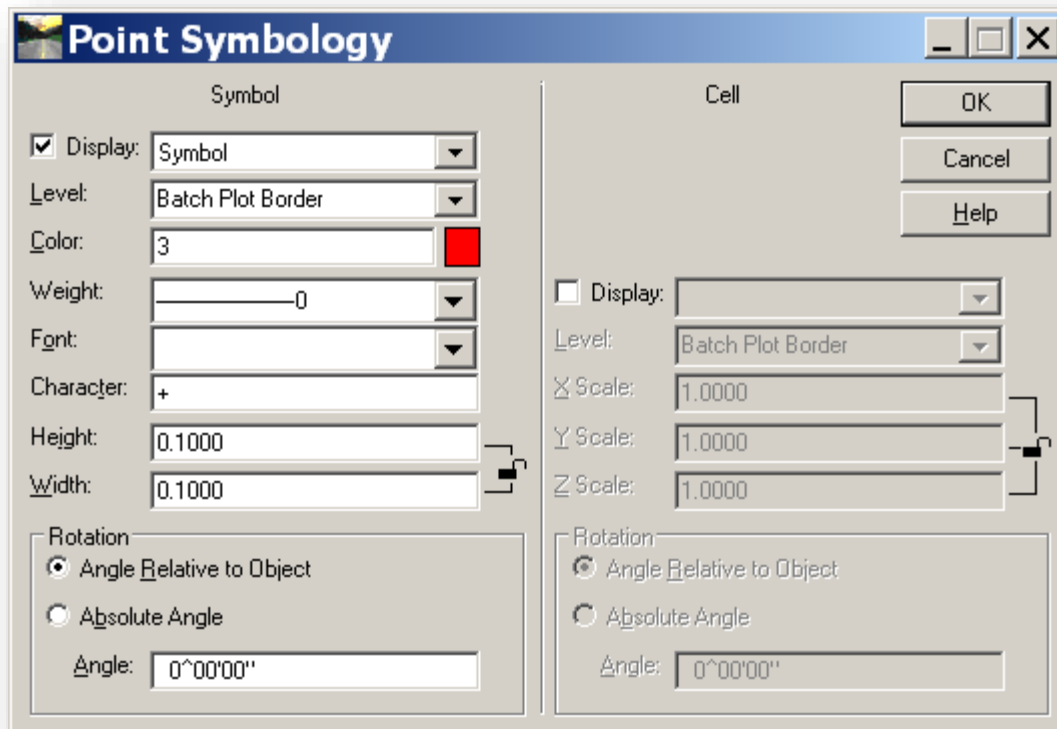


8. Uncheck Display under Symbol and check Display under Cell. Select the appropriate cell and Level Name for the feature. Click OK.
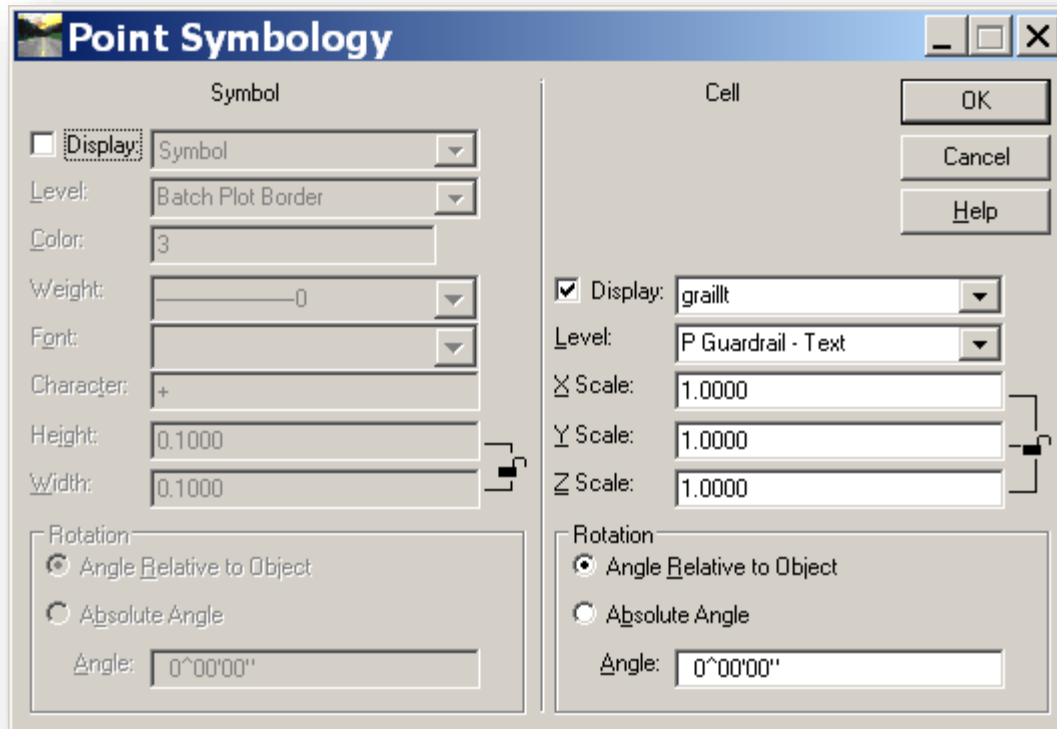
9. Click Apply and then Close on the Named Symbology Panel.
10. Create Cross Sections using Evaluation/Cross Section/Cross Sections/Create Cross Section. Ensure that the surfaces containing the features to be drawn as cells are selected to be drawn. Upon completion, the features for which Cross Section Point was initialized in the Named Symbology Manager should be drawn with the specified cells.

### *7.9-10d    Steps to Show Guardrail on Cross Sections:*

1. Ensure that the guardrail features have the following styles: Feature Type        Style:

   Guardrail on Left Side          P_RDWY_GR Left
   Guardrail on Right Side         P_RDWY_GR Right

2. Ensure that preference file INDOT.xin is loaded.
3. Ensure that Global Scale Factor is set to scale of cross sections
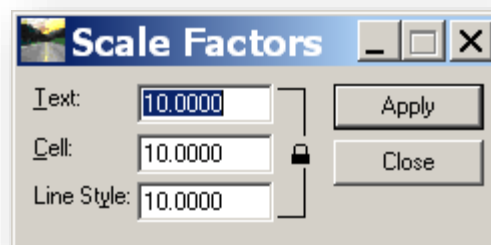
4. Create Cross Sections using Evaluation/Cross Section/Cross Sections/Create Cross Section. Ensure that the surface containing the guardrail features is one of the surfaces selected to be drawn. (Skip Steps 5 through 7 below if styles listed in Step 1 have been configured in the Named Symbology Manager to show cross section points as cells.)
5. Reset Global Scale Factor to scale of cross sections.
6. Select Update Cross Section Leaf. Select Crossing Features Leaf. Then select Surface and Feature Names for the guardrail features that you wish to add.
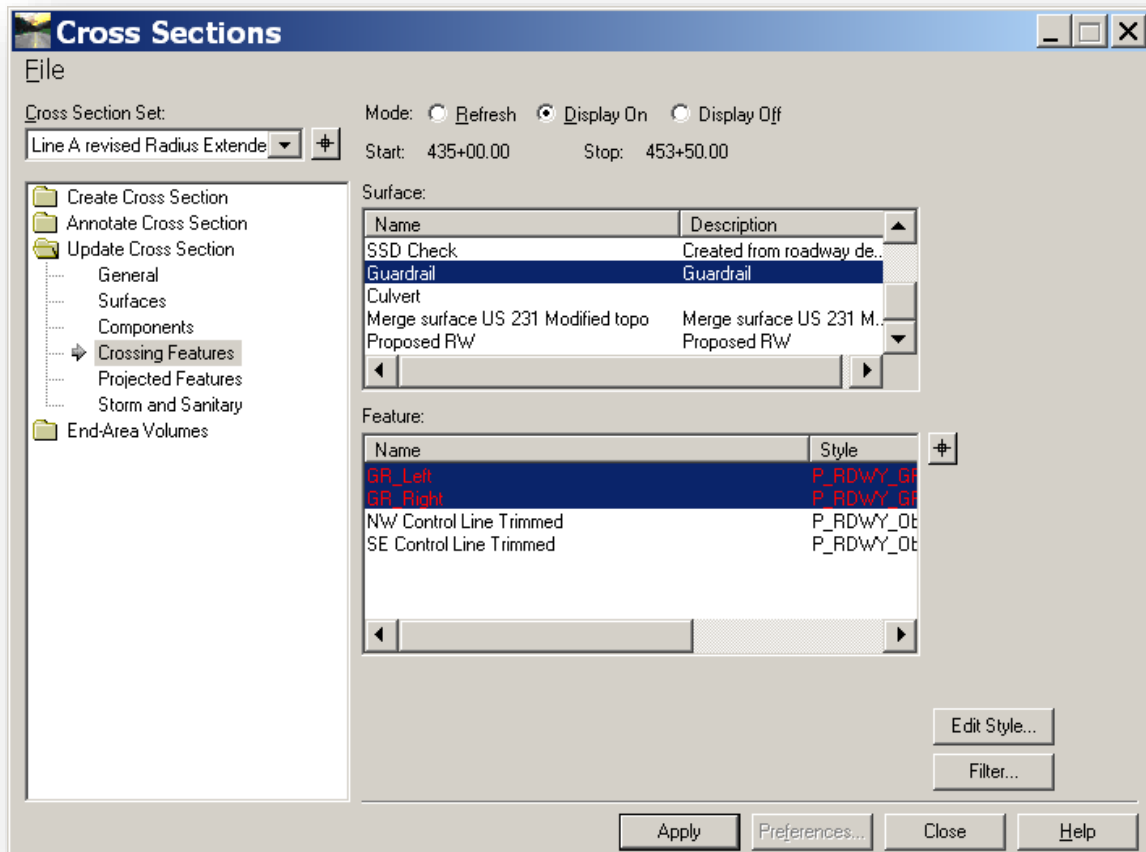


7. Select Apply.
8. Guardrail features should now be shown on the Cross Sections using the cells graillt and grailrt. Open preference file INDOT.xin and reset Global Scale Factor if needed.

### 7.9-10e    Steps to Annotate Right of Way on Cross Sections:

1. Ensure that the R/W features have the following styles: Feature Type Style

| | |
|---|---|
| Existing R/W | RW_ExistingRW |
| Proposed Permanent R/W | RW_ProposedRW |
| Proposed Temporary R/W | RW_TemporaryRW |

2. Ensure that preference file INDOT.xin is loaded.
3. Ensure that Global Scale Factor is set to scale of cross sections
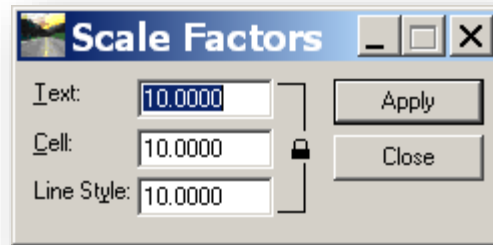
4. Create Cross Sections using Evaluation/Cross Section/Cross Sections/Create Cross Section. Ensure that surface containing the R/W features is one of the surfaces selected to be drawn. (Skip Steps 5 through 7 below if styles listed in Step 1 have been configured in the Named Symbology Manager.)
5. Reset Global Scale Factor to scale of cross sections.
6. Select Update Cross Section Leaf.  Select Crossing Features Leaf. Then select Surface and Feature Names for the R/W features that you wish to add.
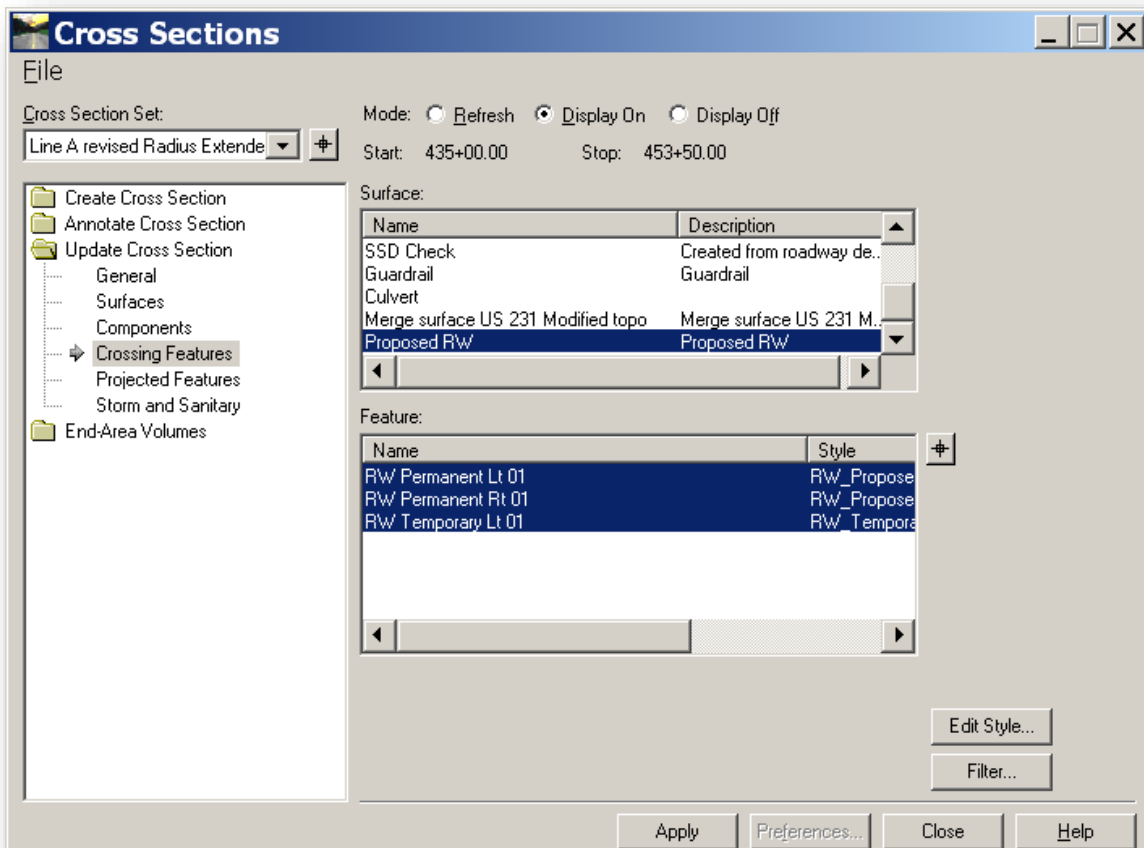


7. Select Apply.

8. R/W features should be shown as cells. Reset Global Scale Factor if you have not already done so.

9. Select Annotate Cross Section Leaf. Select preference IN RDWY RW Annotation.
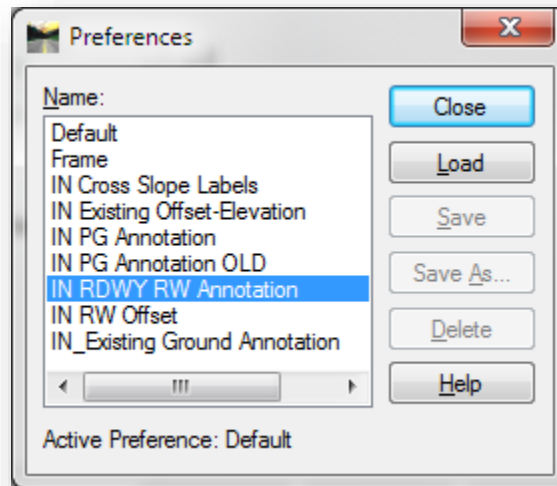


10. Select the surface containing the R/W features in the General Leaf.
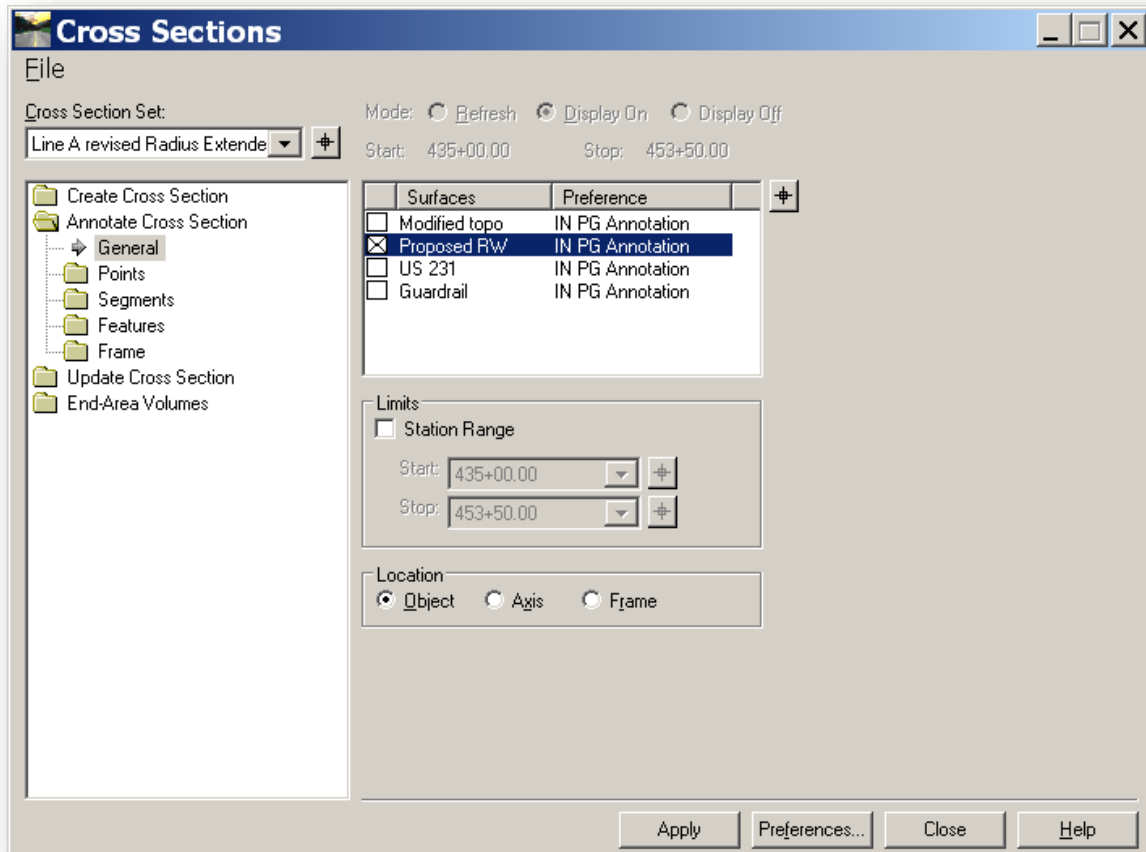
11. In the Features/Annotate Leaf, select the R/W features to be annotated.
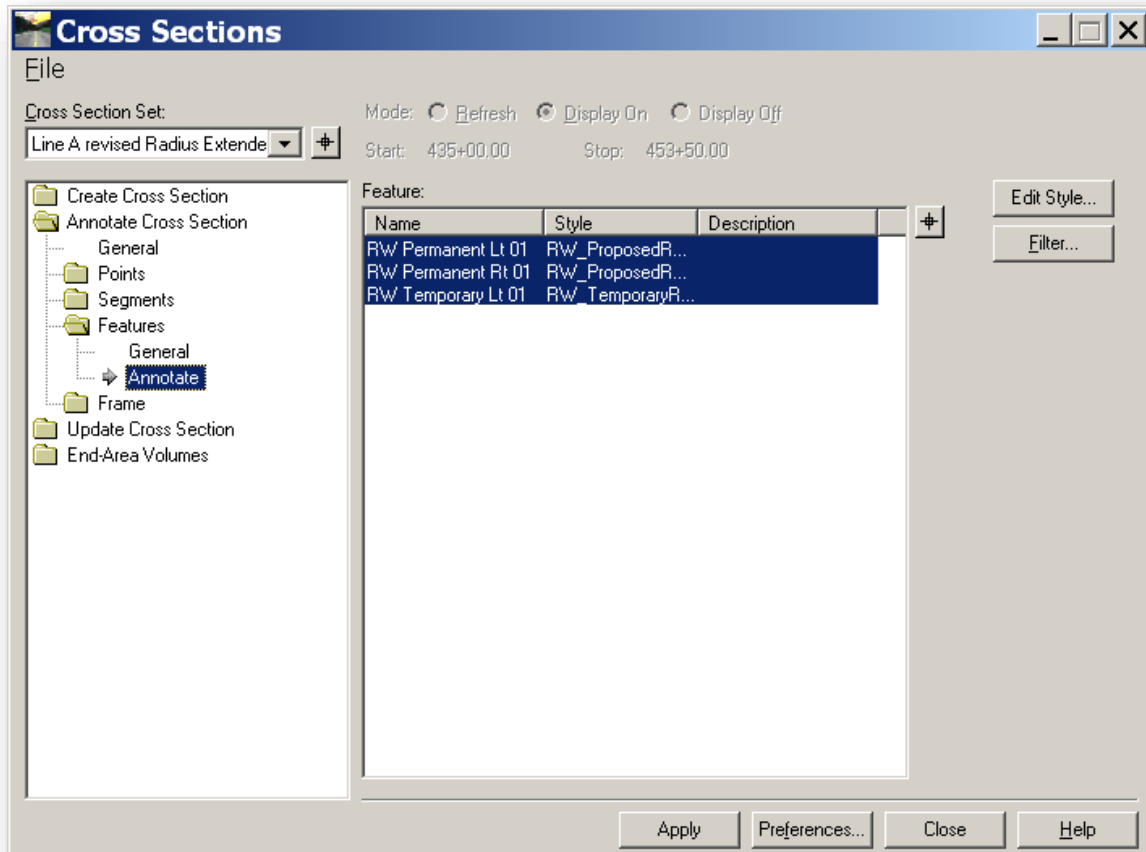
12. Select Apply. When this step is completed, R/W offsets should be labeled.

### 7.9-10f    Steps to Annotate Profile Grade on Cross Sections:

- Ensure that the feature representing the Profile Grade has Style: P_RDWY_Centerlines.
- Ensure that Global Scale Factor is set to scale of cross sections.
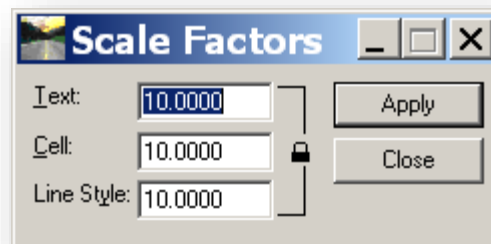


- Create Cross Sections using Evaluation/Cross Section/Cross Sections/Create Cross Section. Upon completion, profile grade should be labeled with cell pgarro.
- Select Annotate Cross Section Leaf.  Load Preference IN PG Annotation.  Select Design Surface on General Leaf.
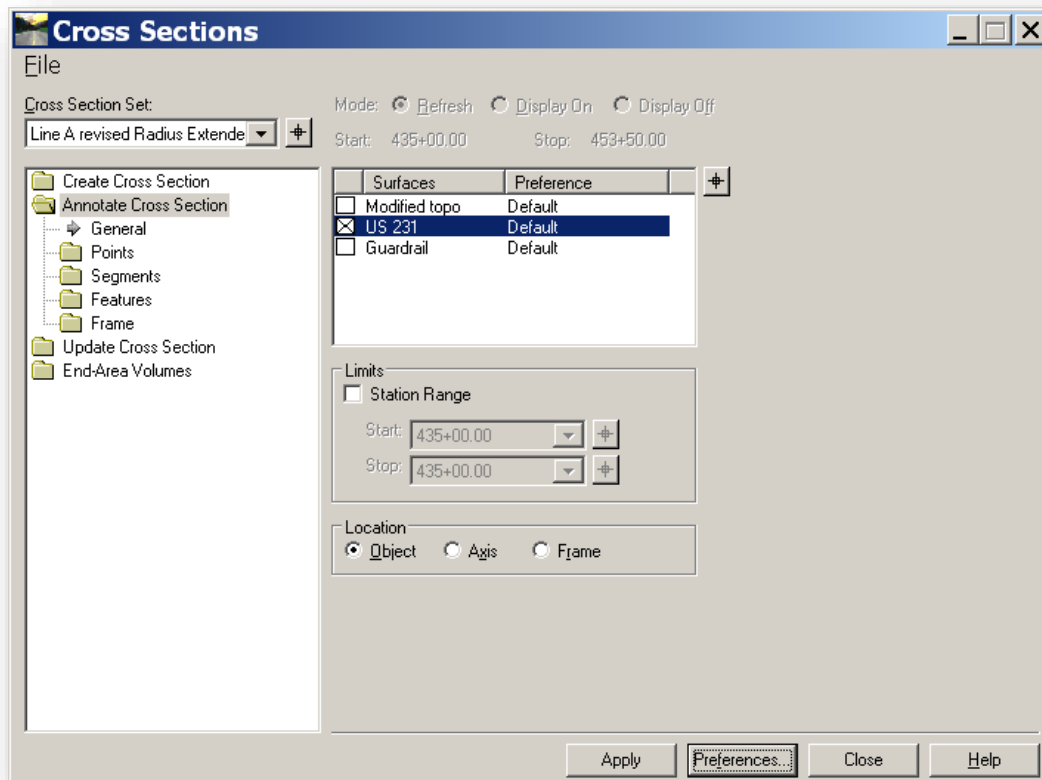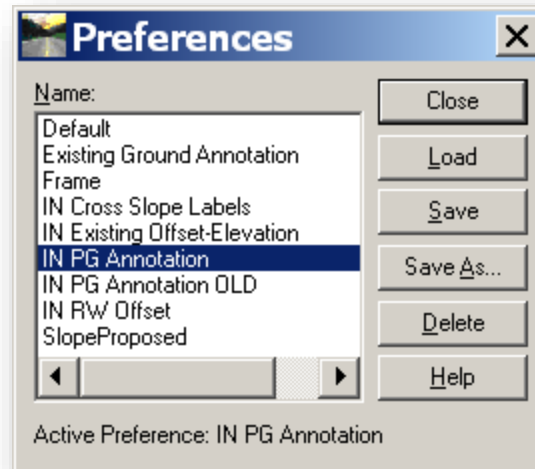
- Select Features/Annotate Leaf. Highlight Profile Grade feature.
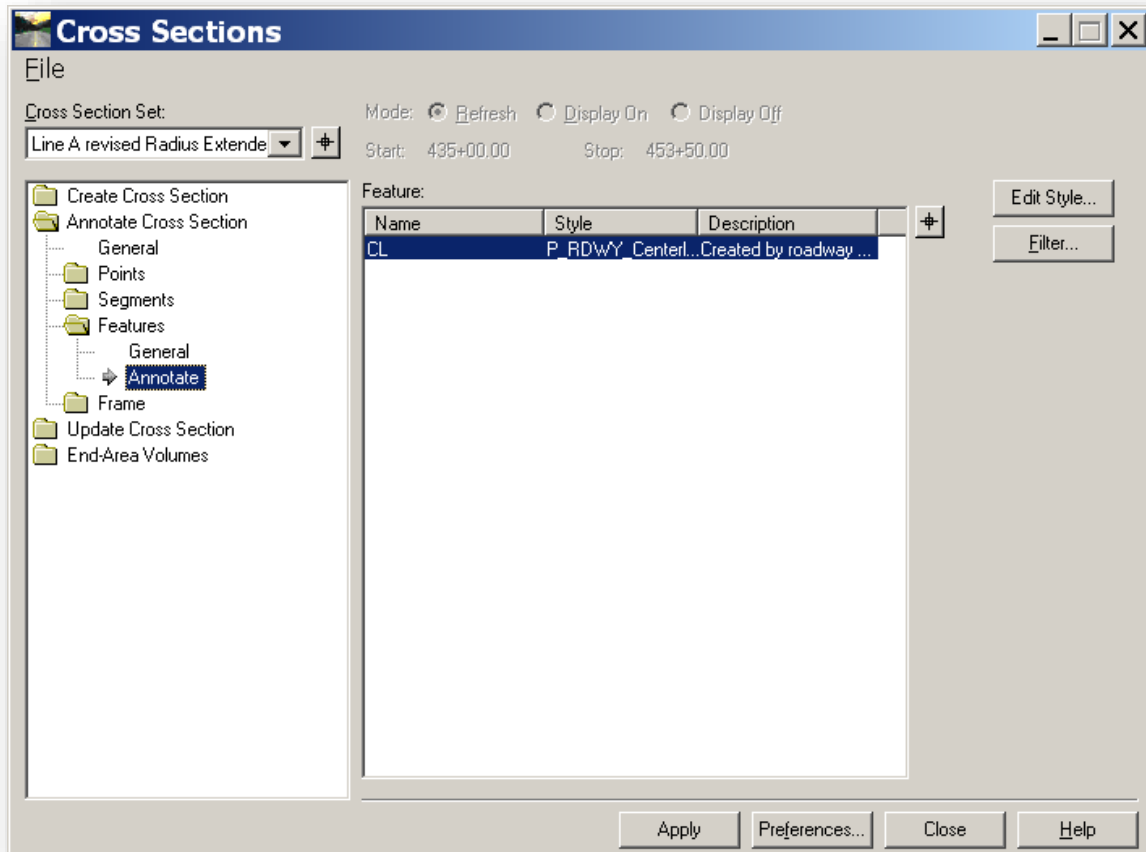
- Click Apply. Upon completion, profile grade elevations should be labeled.

## 7.10    InRoads Performance Tips

While working with InRoads, DGNs have a tendency to become bloated due to many of the automated processes that occur during day to day use of the software.  To alleviate some of these issues that result in poor performance, these items should be tried prior to contacting CAD Support:

1.  Make sure the appropriate seed files are being used.  These files can be found at pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\InRoads\. These seed files are configured without Design History enabled to prevent the historical recording of subsequent display commands and to maintain a manageable file size.
2.  Compress DGNs regularly.  Again, displaying items repeatedly can also build up in the DGN buffer, which can be alleviated by using the File -> Compress -> Design and Options items in MicroStation.  It's advised to perform both types of compression, and enabling all features on the options panel, as each function removes cached items from the DGN.
3.  After performing any plans production operations (plan profile sheets, cross sections, etc.) that place sheets in the base drawing, consider the following:
    a.  Detach any unneeded references (borders, etc.)
    b.  Delete and compress any unneeded elements.

  c. Remove tag sets (Element -> Tags -> Define), highlight each tag set and select Remove.
4. Isolate long sets of cross sections, and dispose of draft copies when possible.

By performing these operations throughout the design process, performance will be increased by minimizing the amount of data in a single DGN.  Additionally, this will limit the number of instances of ProjectWise title block integration that must be resolved prior to a DGN becoming available to use once open.

# 8.    Using InRoads and ProjectWise for Real Estate

The following chapter will examine possible workflows for numerous Real Estate functions, such as the development of Parcel Plats, Exhibits, Right of Way plans; along with the review of the custom reporting functions that have been created.  Note that this chapter is procedural in nature, so further review of ProjectWise, MicroStation and InRoads functions and integrations should be reviewed in their respective chapters.

## 8.1    The Real Estate Project Structure.

When creating a Real Estate Project using the DOTWise Project Creator, all Real Estate projects will be provided the following folder structure:
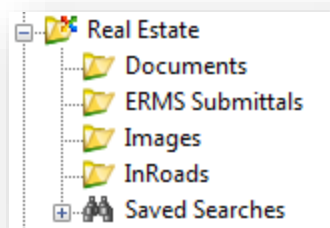


The Real Estate Folder Structure

In these folders, the following types of data are recommended:

- Documents – Any project documentation, correspondence, or other files relevant to the project including spreadsheets, PDFs, etc.
- ERMS Submittals – These should include any documents that are prepared and finalized in preparation to upload to the INDOT ERMS system.
- Images – Any imagery for the project can be stored in this folder.  This can include aerials, or on site digital photos.
- InRoads – This folder should include all the project CAD data such as MicroStation and InRoads data.

In addition to the provided folder structure, additional folders can be created under the Real Estate level and each of the provided sub folders to fit the needs of the projects.  These are merely the folders that are initially provided.

## 8.2    Required InRoads Application Add Ins

As part of the InRoads Real Estate process, there are specific Application Add-Ins that need enabled in the InRoads environment.  These Add-Ins can be enabled from the *InRoads Explorer -> Tools -> Application Add-Ins menu option.*  The following Add-Ins should have their respective check boxes enabled:

- Lot Layout Add-In – Commands for the creation and manipulation of lots, setbacks and rights-of-way.

- Traverse Edit Add-In – Tool used to create horizontal alignments from deed/plat descriptions.
- Multiple Horizontal Element Regression Analysis Add-In – Commands for horizontal alignment creation and editing with the inclusion of regression by least squares analysis.

Additional Add-Ins such as those discussed in Chapter 5.5.4 can/should be enabled as needed as they will simplify locating tools and features, and ease the development of finalized deliverables.

## 8.3    Incorporating and Converting Survey Data

Incorporation of survey data will insure a logical starting point for Real Estate activities.  Survey Data for many projects will be available in ProjectWise in the Survey & Aerial Engineering folder.  If the survey has been completed in InRoads much of the data will be available with minimal effort.

### 8.3-1    Inspecting the Survey Folder in ProjectWise

Upon inspection of the Survey and Aerial Engineering folder in ProjectWise, you are likely to find numerous relevant files in ProjectWise. Per the most recent revisions to the Indiana Design Manual:

"Each InRoads survey file submitted to INDOT shall use the format and provide the content as described below.

DES#_SRxx Name.extension

Key:

- DES#: designation number for project as provided by INDOT
- SRxx: route number of project, for example: SR37, SR162, I64, US150
- Name: descriptive name of information in file, for example: Topo, LCRS Plat
- Extension: file extension name, for example, .xin, .dgn, .fwd

The files to be submitted to INDOT for each survey are as follows:

1. Des #_SRxx Control Points.fwd
2. Des #_SRxx LCRS Plat.pdf
3. Des #_SRxx LCRS Plat.dgn
4. Des #_SRxx Survey Alignment.alg
5. Des #_SRxx Survey Book.docx
6. Des #_SRxx Survey Surface.dtm
7. Des #_SRxx Survey Surface Boundary.dtm
8. Des #_SRxx Survey.xin
9. Des #_SRxx Topo.dgn
10. Des #_SRxx Topo.fwd
11. IN_GeoCS.dty
12. Esri_cad.wld

With the above mentioned documents available, they comprise the starting point for Coordinate Geometry.

In some instances survey data has not been placed in the Survey & Aerial Engineering folder. This is often the case when surveyed by non-INDOT staff. It can be located as a subfolder to Design. As can be expected when the data is not present in the Survey & Aerial Engineering folder, further investigation by the responsible party is necessary.

ROUTE SURVEY

The Route Survey (LCRS) document for the project is also likely to be present with the above referred to Survey documentation. It likely exists in Cad file format as well as the recorded adobe pdf document. Both of these types of data are readily utilized in MicroStation.

### 8.3-2  Copying Data from within ProjectWise

Data present in the Survey & Aerial Engineering folder may need to be accessible in a read/write manner to perform further Coordinate geometry operations. ProjectWise permissions ensure that users only have the ability to modify files in their folders. Because of these permissions, data is protected from groups other than their creators and is visible in a read only fashion to everyone else. When read/write is required the most straightforward workflow is to copy the file(s) in question to the user(s) folder. For example dragging files from Survey & Aerial Engineering / Project Files folder to Real Estate / InRoads.

### 8.3-3  Copying Data from Other Sources

In some cases, you may receive your data from sources that don't have access to ProjectWise. In these instances, you could possible receive your information via e-mail, CD, or ERMS. For these situations, we will look at using a Drag and Drop import to bring this information into our datasource.

For ERMS file transfers, you must first get the documents to a folder on your local PC, in a folder you have access to. Some suggested locations could be a folder on your desktop, a C:\Projects location, or perhaps C:\temp. As the steps to extract data from ERMS are specific to the application, we will not discuss them here.

With the files in a location that you can access, open your ProjectWise Explorer to the appropriate folder in the Real Estate folder structure. With this location now open, navigate in Windows Explorer or your Outlook E-mail client and select the file or files (using either Ctrl+click or Shift+click selection methods), and continue holding your lt. mouse button down while dragging the selection into the Document Panel of ProjectWise.
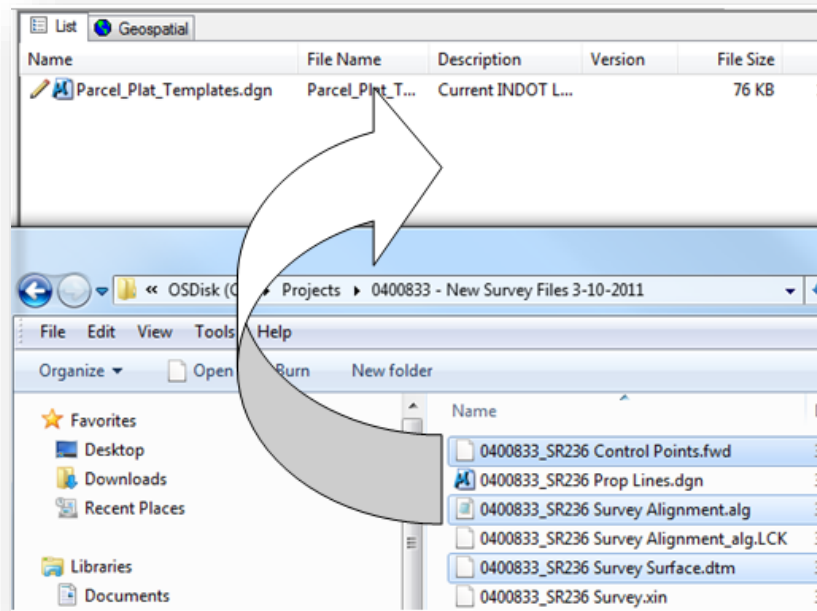
**Drag and Drop from a PC**

### 8.3-4   Converting Survey Data to Geometry

Incorporation of Survey field book data (*.fwd) into Geometry Project Data can be accomplished using the Survey Data to Geometry functionality from the Survey menu.  Survey data will be available with the same code numbers used by survey for all data collected. Survey alignment geometry *.alg files are likely to only contain what the surveyor thought was necessary for creation of survey geometry elements.  Any remaining surveyed points can be published to COGO geometry if it is felt desirable items is missing.  Using the option to replace data will insure that no duplicates are created with the Survey Data to Geometry functionality.

On the Survey Data to Geometry panel, options to filter the data being copied are available.  Filter is consistent throughout InRoads.  Utilize filter to restrict; points by code range, random vs breaklines, specific style names, and numerous other alternatives.  Curve stroking option inserts vertices in linear elements based on a chord to arc tolerance.  This may not be desirable as more points that were collected in the field are generated.  Duplicate Name set to Replace or rename will dictate the copy behavior when the same COGO point names already exist in the destination geometry project.  Preferences button reveals specific settings predefined for a particular reason (ex. SurveyDataToRW).
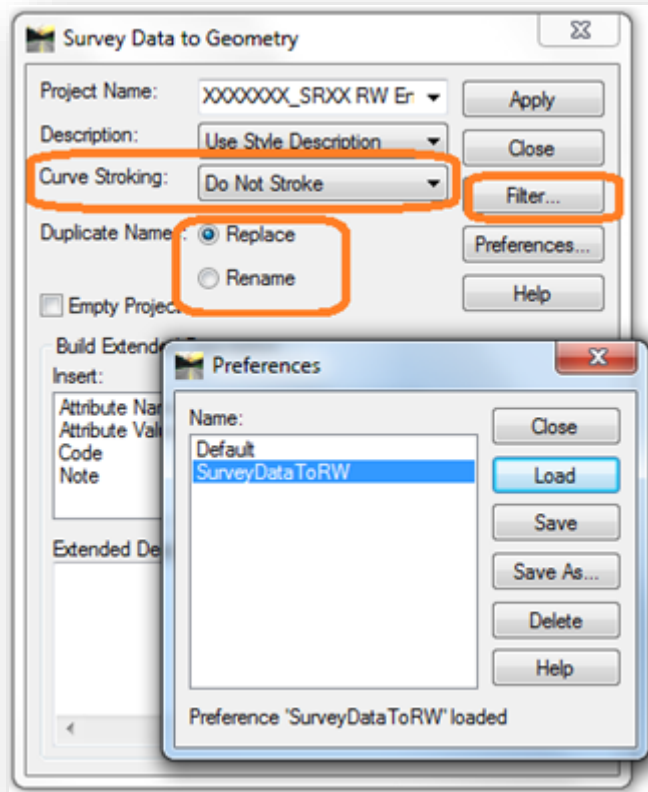
Survey Data to Geometry

## 8.4    Incorporating Proposed Right of Way Data from Design

Design right of way information can be included in the project process through a number of different methods depending on the type of data available.  The most desirable form of data would be Geometry defined in a designers InRoads geometry file or .alg.  InRoads geometry files will require virtually no manipulation of data to incorporate the details of the proposed right of way into coordinate geometry calculation. In the event that the designer does not provide InRoads geometry, conversion of cad graphics is likely the next most practical vehicle for incorporation of geometry data in the project.

Cad data is probably the most readily available data, especially from INDOT consultants.  When cad data is not available, and the range or information available is more likely an adobe PDF file, proposed alignments can be created using the methods described in the InRoads Right of way training. Coordinates file type data can also be incorporated using the InRoads text import wizard utility. Typical examples might be Traverse PC, PC Survey, MX, PDF files, OCR PDF file, or other ASCII type data.

### 8.4-1   Right of Way from InRoads Geometry

When Project data is available via InRoads Geometry Project, users should open the appropriate designer's alg file.  Using the *Geometry -> Copy Geometry* tool will allow elements to be copied from

the designer's alg to your current geometry project.  This ensures you will have full access to the alignments, and COGO points as needed
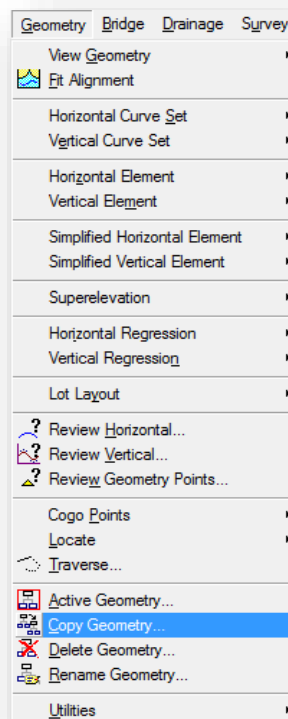


Copy Geometry

From this panel, you can select all the various components of a Geometry project and copy them to a differing file.  This includes horizontal alignments, vertical alignments, and COGO Points.
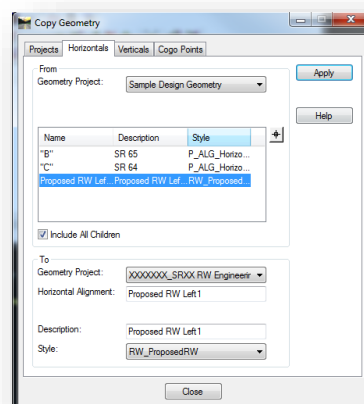


Copy Geometry

Once data Geometry data has been copied, it may be necessary to rename the data for clarity purposes.  This can be accomplished using the Geometry -> Rename Geometry tool on the InRoads Explorer.

### 8.4-2   Right of Way from Graphical Data

In many instances, Right of Way information may only be provided via a CAD file (DGNs, DWGs, DXFs, etc.).  InRoads can accommodate this via the *File -> Import -> Geometry* option on the InRoads Explorer.
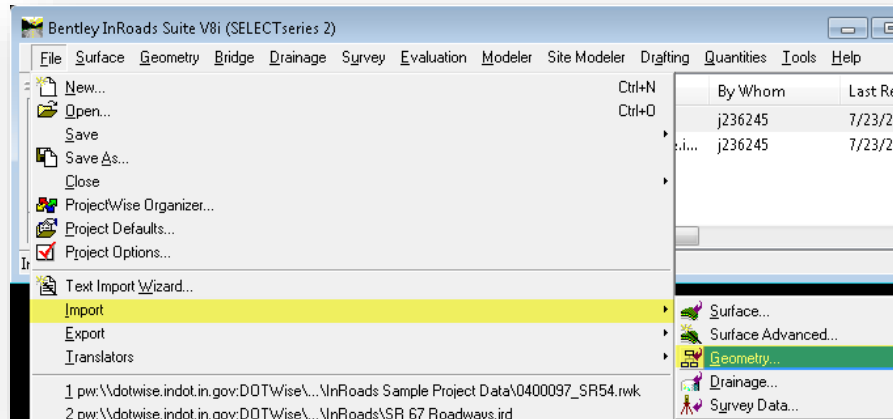


**Importing Geometry Data**

When in the Geometry import tool, the first option presented will be the *Graphical* option.  On this panel one can configure all the relevant options to capture a pre-existing CAD element and turn it into Geometry data.
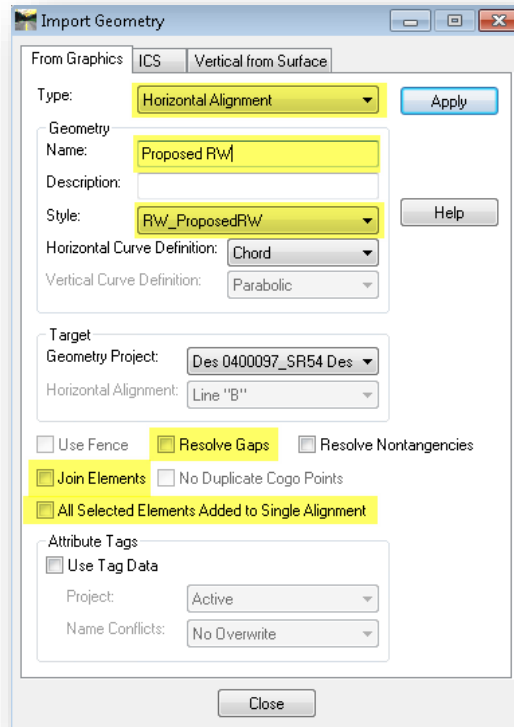
**Graphical Geometry Import**

The highlighted options in the previous illustration should be configured as necessary. A brief description of each option:

- Type – This is the type of Geometry element that will be created upon import. For the purposes of Right of Way, this should only be Horizontal Alignment or COGO Points.
- Name – This is the name of the element that will be created in the Geometry project. Note that when multiple elements are selected for import, this name will be enumerated so it may be advantageous to have the name end in a number.
- Style – This is the style that each element will be defined with upon import. Most instances should have this as one of the RW_ (Right of Way) or CG_ (COGO Point) feature styles.
- Resolve Gaps – Closes gaps between adjacent linear elements. The software passes across the data and removes gaps between adjacent linear elements.
- Join Elements – If checked, joins two adjacent elements provided that they are joinable (like elements, coincident common points, like tangential directions, like radii for circular).
- All Selected Elements Added to Single Alignment – If checked, imports all elements of a selected multi-element graphic to a single alignment. If not checked, imports each element of a multi-element graphic into different alignments.

Once configured, selecting the Apply button will switch back to MicroStation allowing for the graphical selection of the CAD elements. This selection follows all MicroStation conventions for

element selection so Shift + Click, Ctrl+Click, and Drag/Window selection methods are all viable for selecting the elements.

In addition to this method, elements can also be pre-selected prior to starting the Import -> Geometry tool using the standard MicroStation element selection tools such as Power Selector.  When used in this manner, any pre-selected elements will automatically be added to the Geometry project when the Apply button is selected.

### 8.4-3   The Text Import Wizard

In addition to InRoads Surface data, and CAD data; text data may also be provided specifically for COGO points as their nature lends itself to being transferred as tabular data.  In these instances one may receive data in TXT or CSV formats which can be brought directly into InRoads via the Text Import Wizard.

The Text Import Wizard can be found on the InRoads Explorer under *File -> Text Import Wizard*.
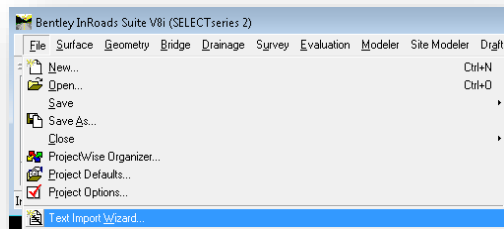

**Text Import Wizard**

When starting the Text Import Wizard, one must first select the Data Type being imported, along with the file name where the data can be found.  *Note that when selecting a file from ProjectWise, the Application Type on the ProjectWise Open dialog may need changed to All Applications as this data is not limited to text only formats.*
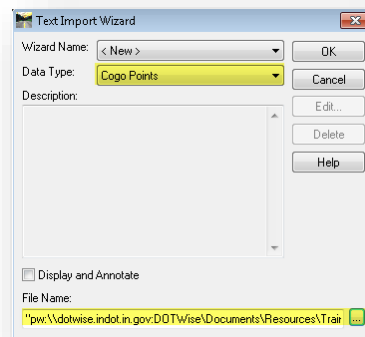

**Text Import Wizard – Setting Data Type and File**

Upon selecting the OK button, the Wizard will begin with the process of configuring the data.  The first panel allows for the definition of the Import Range.  This is provided by giving the start and end lines of the data being imported.  Depending on the source there may be header or other data that needs excluded as in the following illustration.  As shown, starting at line 7 will exclude the header information from the import.
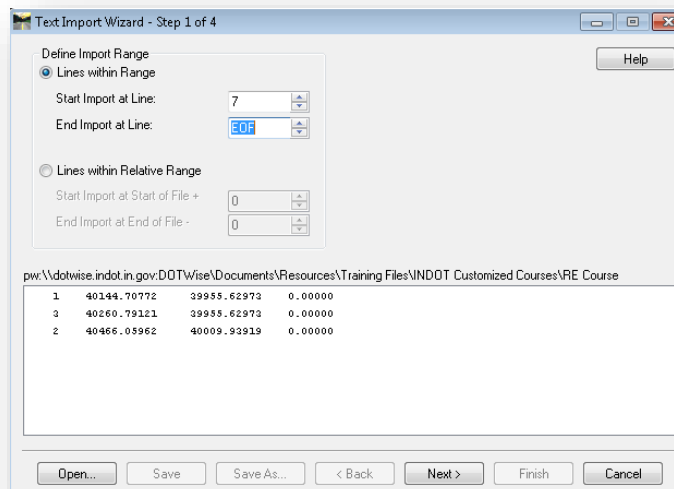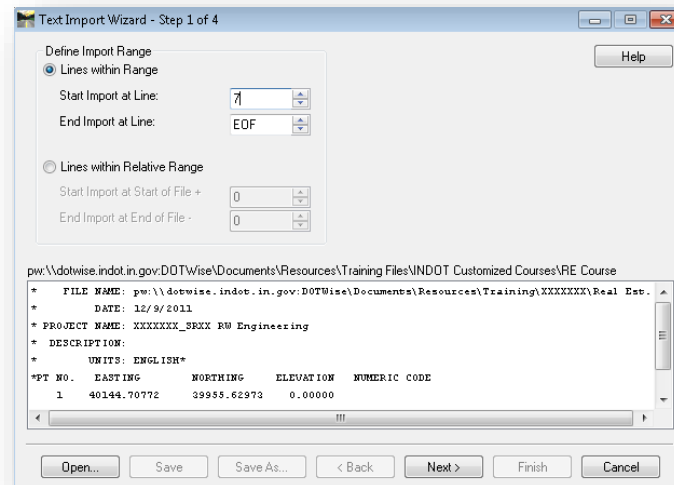


**Changing the Import Range**

With the Import Range set, one can proceed to the next panel and start setting up the data type and any filters.
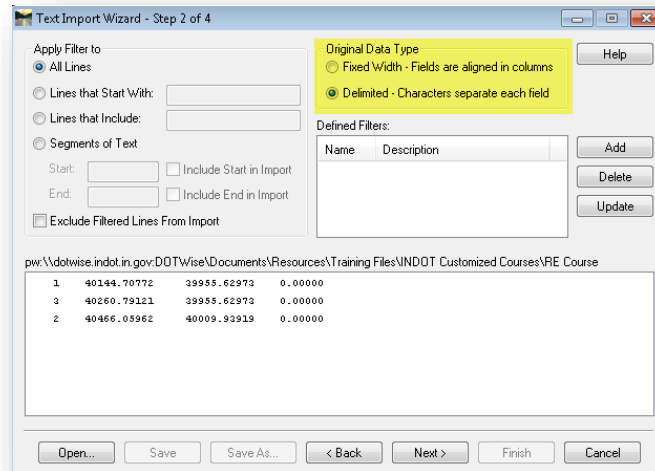
**Filters and Data Types**

Depending on the source data, there may be rows that need filtered out for a clean import.  Often times this will be items such as embedded time stamps/dates or page numbers.  On this panel these types of data can be filtered out as necessary.  Also, this panel contains the definition for how the data should be separated.  Again depending on the source and file type, the provided data may be in a Fixed Width (consistent column layout) or Delimited (common field separator) format.  This should be identified on this panel.

The next panel allows for the definition of the data columns and changes depending on the Original Data Type defined.  The following illustrations show both potential options.
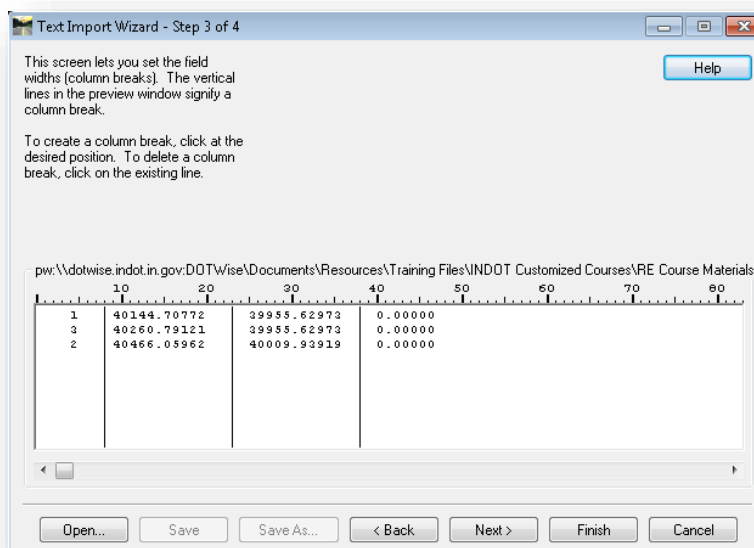


**Fixed Width**

The fixed width option allows for the separation of data columns through consistent spacing.  When using this method, one only needs to click on the appropriate space between columns to set the column definition.
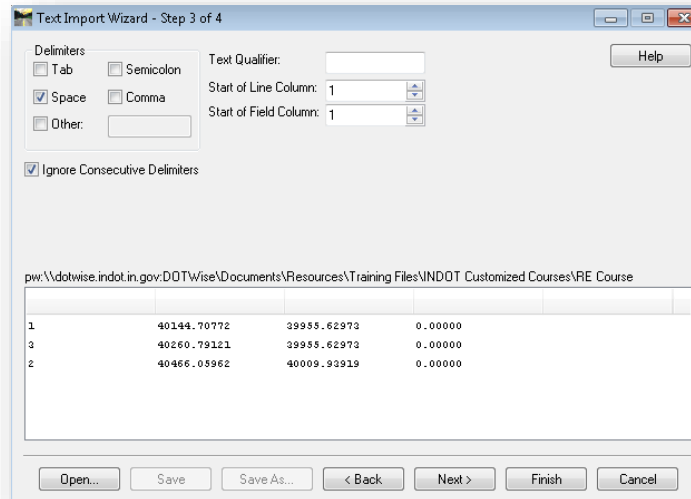


**Delimited**

When using Delimited, this panel will allow for the configuration of the columns based on a consistent character.  Often this will be spaces or commas depending on the original data source and the selection should be made appropriately to separate the data.

In both instances a live preview will show how the columns are separated allowing for adjustment as needed.  Once setup, proceeding to the next panel allows for the definition of each columns data type.
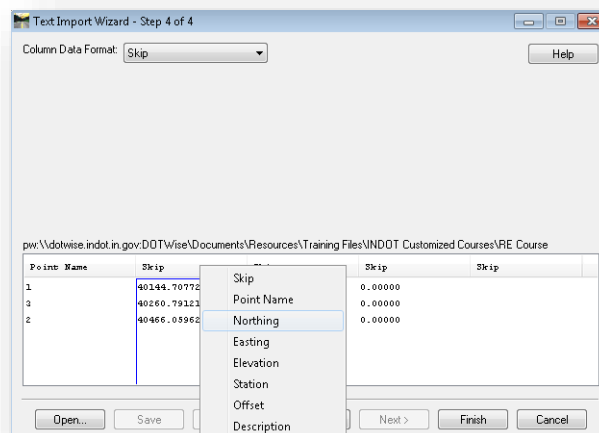


**Setting Column Data Types**

On this panel one can define the type of data each column contains. There are a variety of different data types, but the primary ones used are Point Name, Northing, Easting and Elevation. The other options can be reviewed via the Help file. Once the column data is defined, selecting Finish will kick off the import process. Upon completion, InRoads will provide an import status as follows.
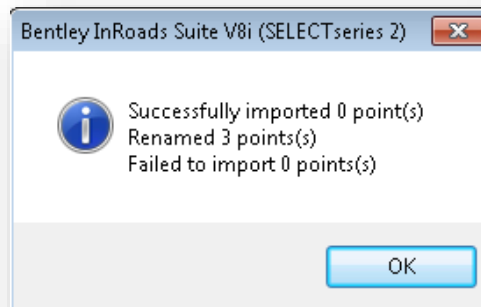


Import Status

## 8.5    Creating Parcels from COGO Points

The previous sections have discussed the process of gathering and getting data from a variety of sources prepared for use. This section will review creating parcels and the various manipulation tools that are used throughout this process.

### 8.5-1    Create/Edit Alignment by COGO Points

Geometry Alignments often follow Existing COGO points that have been observed through field data collection. When these points are provided and brought into the geometry project through one of the methods described in the previous section, creating the Parcels is often as easy as "connecting the dots". This method is accomplished through the Create/Edit Alignment by COGO points tool which can be found under the *Geometry -> Utilities -> Create/Edit Alignment by COGO points* option on the InRoads Explorer.
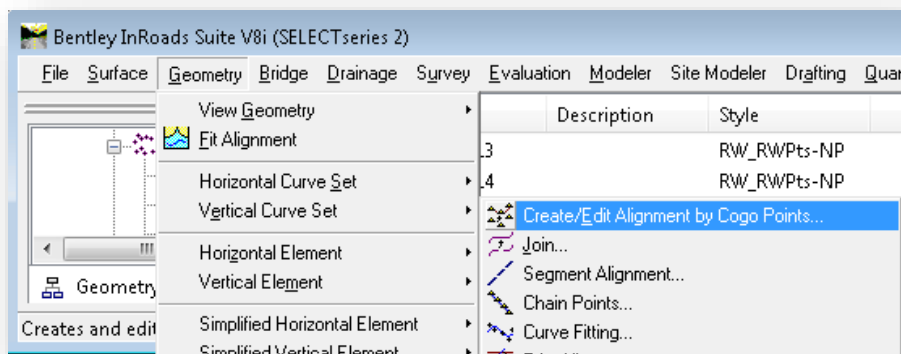


Create/Edit Alignment by COGO Points

When starting this tool, the following window is presented.
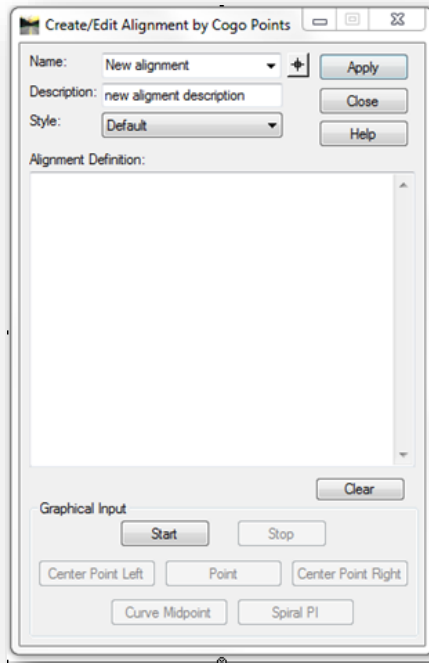
**Create/Edit Alignment by COGO Points**

When using this tool, one can provide a new alignment name and description directly on the tool. Once these have been defined the appropriate Style should be selected, again this will be one of the RW_ (Right of Way) styles provided in InRoads. With these items configured, the alignment can then be created. There are two methods to do so:

- Manual Key-In – When using this method, the cursor should be placed in the Alignment Definition portion of the window. COGO point names can then be keyed in with a space between each point name. To close the alignment, the first point should also be entered as the last as well.
- Graphical Input – This method uses the Graphical Input buttons on the lower portion of the panel and allows for the graphical selection of the points. When selecting points this way, their names will be populated in the Alignment Definition section allowing for the adjustment of COGO point names as needed.

When satisfied, selecting the Apply button will confirm the alignment definition and create it in the Geometry project. It will also display a graphical representation of the alignment in the CAD file using the defined InRoads style.

### 8.5-2   The Traverse Tool

An additional method to creating the Alignment (Parcels, deeds, plats, or otherwise) is through the Traverse command. This command isn't part of the base InRoads setup, and has to be enabled as an Application Add-In which is discussed in Chapter 5.

With the Add-In enabled, the following new commands will show up under *Geometry -> Utilities*.

- Traverse Edit
- Metes and Bounds
- Traverse Adjustments

This section will look at the Traverse tool found under *Geometry -> Traverse*.



**The Traverse Tool**

The Traverse tool has 3 separate methods for alignment creation: Angle, Direction, and Curve. Each of these methods behaves differently so the following discusses each briefly.

*Angle Method* locates new foresight points by specifying the angle and distance from a known occupied point and backsighting another point.
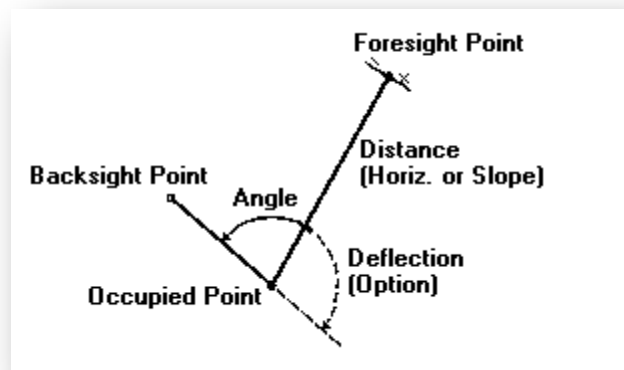


**Angle Method**

*Direction Method* locates new points by starting at a known point and going in direction for given distance.  For example: from point 1 a distance of 120 ft at a bearing of N85^50'34"E.
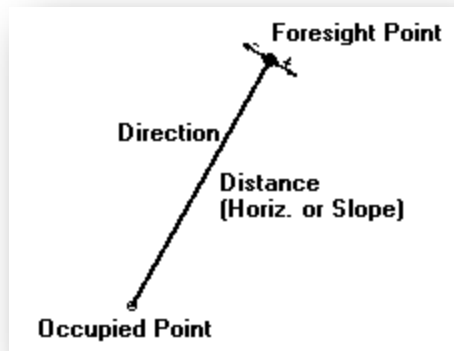


Direction Method

*Curve Method* creates points along curved paths such as lots on curves.
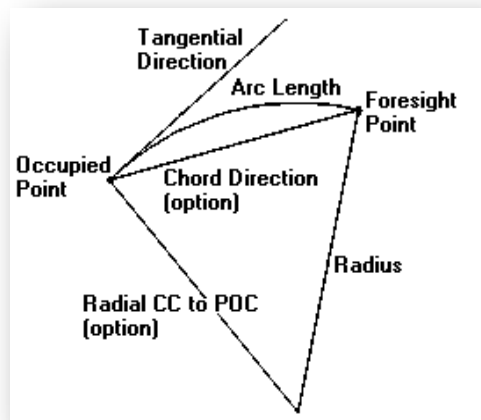


Curve Method

The Traverse command had several ways to deal with how the new points are added. These options are:

- *To COGO Buffer* – Creates new points in the geometry COGO buffer.
- *Before Alignment* – creates new segments on the active alignment before the beginning of the selected element.  COGO points are referred to but not created in the COGO buffer.
- *After Alignment*– creates new segments on the active alignment after the end of the
- *Selected Element* - COGO points are referred to but not created in the COGO buffer.
- *Radial* - holds the occupied point, computing new coordinate geometry points radially from of this point. COGO points are created and placed in the COGO buffer.

The circumstances of creation will dictate which Insertion Point mode is needed. If alignment modes are used, but COGO buffer points are desired, other methods will be required to generate the buffer points.  One such tool is *Geometry -> Utilities -> Assign Names*.

Foresight point options allow the new points names to be specified as well as description and style. Course provides an interface to enter the appropriate Direction, distance, etc.  For 2d entry verify distances are set to horizontal.

Close traverse button will create a closed element after other elements have been added. Graphic Selection buttons throughout the panel allow screen interaction to set distances, select

COGO points, and set bearings. Be aware InRoads locks will affect the behavior of these tools.  An example of this might be using element lock when picking the direction will allow a graphical pick of an existing geometry element to match the bearing.

### 8.5-3   Assign Names

In addition to using COGO points to create an alignment, alignments can be used to create COGO points.  In order to do this, the *Geometry -> Utilities -> Assign Names* should be used.
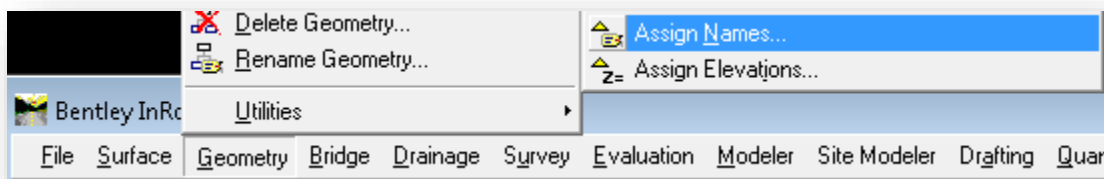


Assign Names

When using the Assign Names tool, one can take a pre-existing alignment and create COGO points at each vertex.  In addition to the creation of the COGO points, this tool also associates the COGO points to the alignment they're created from.
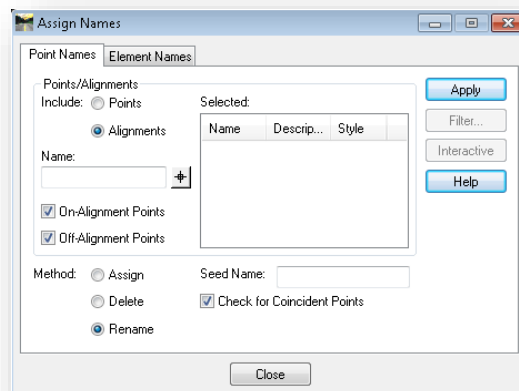


Assign Names Tool

On this panel a few of the items of note:

- *Include* – Determines the types of elements to have names assigned, in most instances this should be set to Alignments.
- *Name* – The name of the element to have names assigned, the values for this entry can be either graphically selected or setup using the InRoads Filter command.
- *On/Off-Alignment Points* – Specifies the point types to be consumed and assigned names.
- *Method* – Determines how points are created. Assign creates new COGO Points, Delete will delete COGO points along an Alignment, and Rename will create duplicated points with a new name.
- *Seed Name* – Specifies the starting point for the assigned names. Commonly numeric, this value will increment starting at the entered number for each subsequent point in the alignment.
- *Check for Coincident Points* – Will cause the alignment association to use an existing point when the coordinates are identical to a pre-existing point.

Upon selection of an alignment, and Applying the selection, COGO points coincident with each point of the alignment. These points can then be used for parcel reporting and other functions. The assign names is especially useful when converting a CAD element into an Alignment and then to derive the COGO points off that Alignment.

### 8.5-4   Metes and Bounds

Metes and Bounds is an application add-in best suited for deed entry when data is simply keyed in from known deed data. It can be found under *Geometry -> Utilities -> Metes and Bounds*.
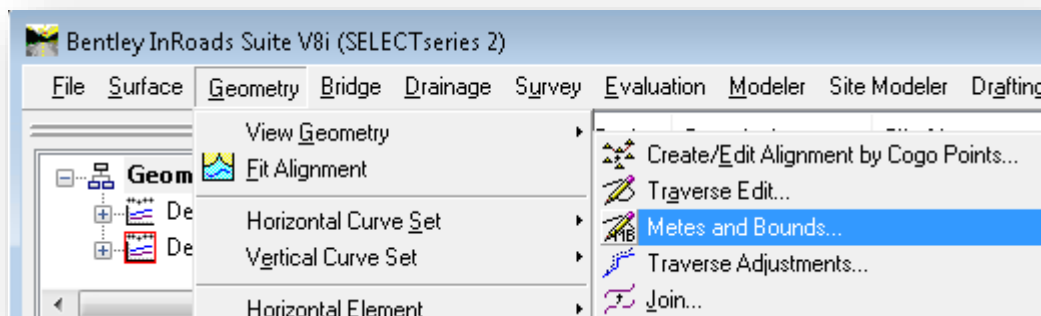


Metes and Bounds

On the Metes & Bounds tool, both the Name (of the created Alignment) and description can be keyed-in. The defining style should be set to the appropriate InRoads Style for the type of element being created. To allow for angular deflections, the Maintain Tangency box should be unchecked.

The starting point should be selected either via graphical selection or by direct key-in of the starting COGO point. Subsequent segments can then be added and removed by right clicking in the Elements section. When creating each segment, the CAD graphics will update dynamically

throughout the process. These fields also allow for the use of mathematical functions directly on the tool. For each segment and vertex, COGO points are not automatically created. To create these points the Assign Names tool discussed in the previous section can be used.
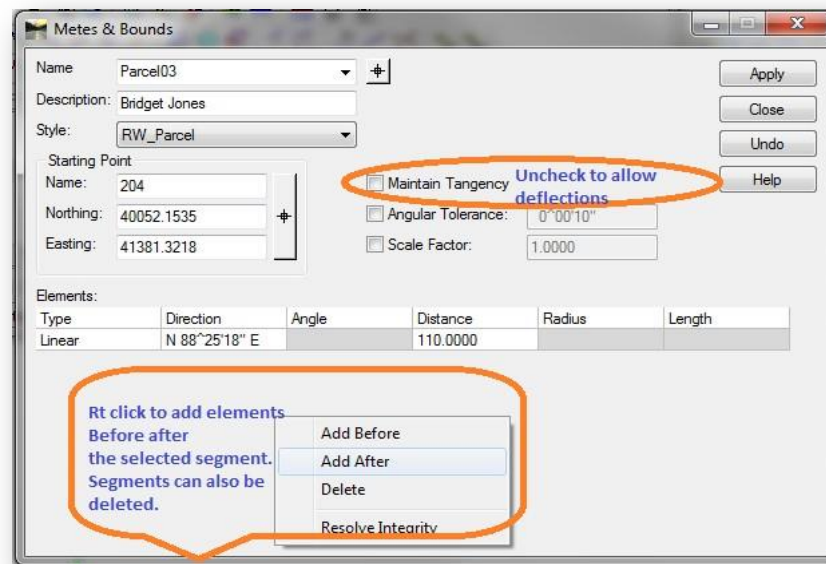


Metes and Bounds
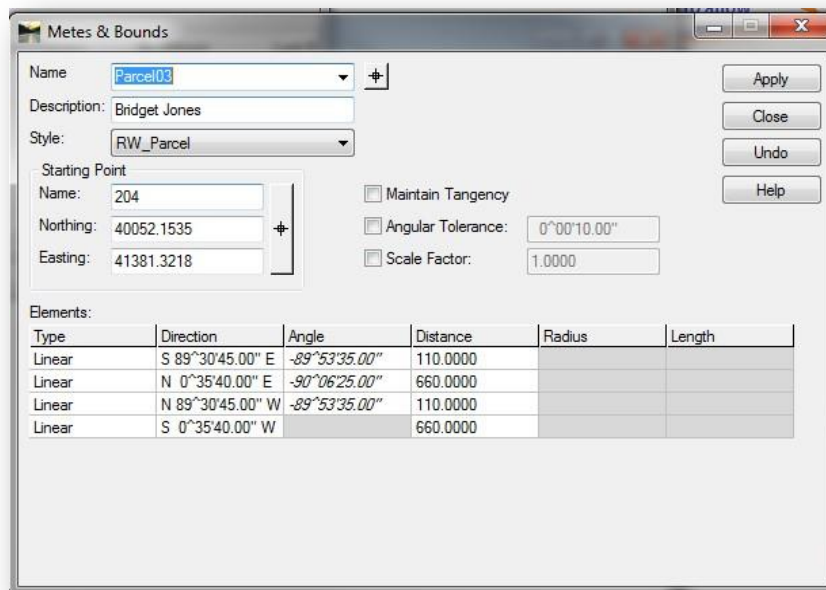


Example of a Completed Alignment/Parcel

### 8.5-5   Traverse Edit

After Property alignments have been constructed, opportunities to examine/edit them in further detail can be achieved with the Traverse edit command.  Traverse Edit is accessed from *InRoads Explorer -> Geometry -> Utilities -> Traverse Edit*. Both the geometry project and horizontal alignment can be selected.



Traverse Edit

The Traverse edit dialog has a number of useful tools/features that may be advantageous during the Real Estate workflow:

- Individual alignment segments can be selected for modification, or for the insertion of new segments before or after the selected segment.
- Traverse closure results such as closing distance, precision, etc. are based on the as entered data on the alignment.
- Using the Map Check option allows for the investigation of Traverses that are not closed.
- The Adjustments option allows for the elements to be adjusted using mathematic methods such as Compass, Crandall, and Transit Rule.

When using the Traverse edit command, usage of the Map Check option will initiate the InRoads Civil Report Browser. The default report provided is the generic Map Check format, however there are a series of addition reports types that are available and may be more relevant to the data at hand.
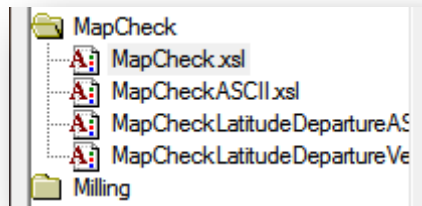


Map Check Report Types

Map Check Report results will resemble those shown below. Report results be saved, printed, or copied to other documentation.



Map Check Report Sample

### 8.5-6 Other Traverse Command Alternatives

The following tools can also be used to create parcel (alignment) geometry, each having their own merits. As with all operations, care should be taken to use the appropriate tool from both a usability and comfort level:

- *Geometry -> Utilities -> Metes and Bounds*  (Application Add in)
- *Geometry -> Horizontal Curve Set* commands
- *Geometry -> Horizontal Element* commands
- *MicroStation-> Place Smartline* using *AccuDraw* in conjunction with InRoads import geometry.

## HORIZONTAL CURVE SET

Horizontal Curve Set commands allow for the creation of alignments by specifying the location of PI's.  InRoads will auto connect these elements.  Precision input of PI location can be specified by using the MicroStation key in dialog.

## HORIZONTAL ELEMENT

Horizontal Element commands allow for the creation of alignment elements individually by specifying the location of each of the various elements.  Elements are connected together with various horizontal element commands.  Precision input of element locations can be specified by using the MicroStation key in dialog.

## MICROSTATION AND ACCUDRAW

Precision input of element data in CAD has long been available in MicroStation using AccuDraw in conjunction with Place smartline.  Most often elements are entered using accudraw's polar mode, available by pressing spacebar.  MicroStation design file settings can be adjusted to have angular readout set to Bearing, or Azimuth.  Save setting to keep these changes in subsequent sessions.  Precision input data can be imported to InRoads geometry using File -> import -> Geometry using the graphical import method discussed earlier in this chapter.

### 8.5-7    MicroStation and Civil AccuDraw

As a highly flexible solution for creation of coordinate geometry, Civil AccuDraw performs similarly to MicroStation AccuDraw but with expanded capabilities to augment any placement tool.  This tool can be used in conjunction with the tools discussed in the previous section.

It is advised to suspend MicroStation AccuDraw when using Civil AccuDraw as much of their functionality does overlap.  Should both be active during the element placement process, one may witness unpredictable behavior, or results.

 *Make sure to disable the standard AccuDraw tool!*

Locate Civil AccuDraw from the Tools -> Civil AccuDraw -> Active Toolbar menu option in MicroStation.  Remember to perform as *Save Settings* to insure MicroStation will keep this toolbar open and located were you placed it from the *File -> Save Settings* menu option.

The Civil AccuDraw Window

AccuDraw Help is available. Included in the help is an overview of the specific key-ins that the tool accepts, along with information on creating custom modes to streamline the data entry process.

### 8.5-8    Translation and Rotation (Transform)

Alignment information is often available without regard to how it fits into a specific coordinate system. Use of the InRoads command *Transform Geometry* allows alignments or COGO points to be moved, rotated, or scaled accordingly. This tool allows for the graphical selection of individual geometry elements, or has a provision to transform all data contained within the selected Geometry Project. Additionally, this tool can also convert data from one set of units to another, for example metric to imperial.
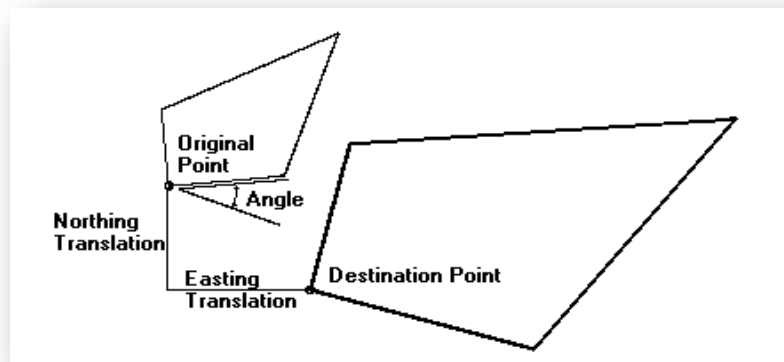


Transformation Types

User can select the original Point as well as destination point for translation. When rotation is desired, user may select angle to specify amount of rotation, or by direction mode to specify original direction as well as destination direction.
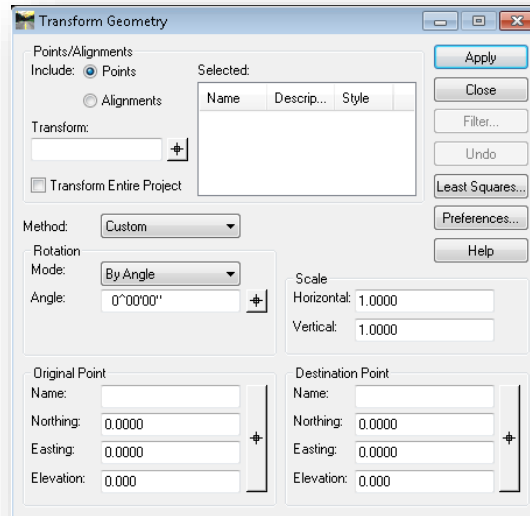
**Transformation Dialog**

## 8.6 Right of Way Tools

Through use of previously discussed tools, a project should have both completed property parcels and Right of Way alignments that cross them. Through the use of the Right of Way tool, one can create parcel takes and the net or remainder. This tool can be found under *Geometry -> Utilities -> Create Right of Way* and must be loaded as an Application Add In to be visible. To load the application add-in refer to Chapter 5.5.4 for this process. This tool in particular is part of the Lot Layout AddIns as noted in Chapter 8.2.
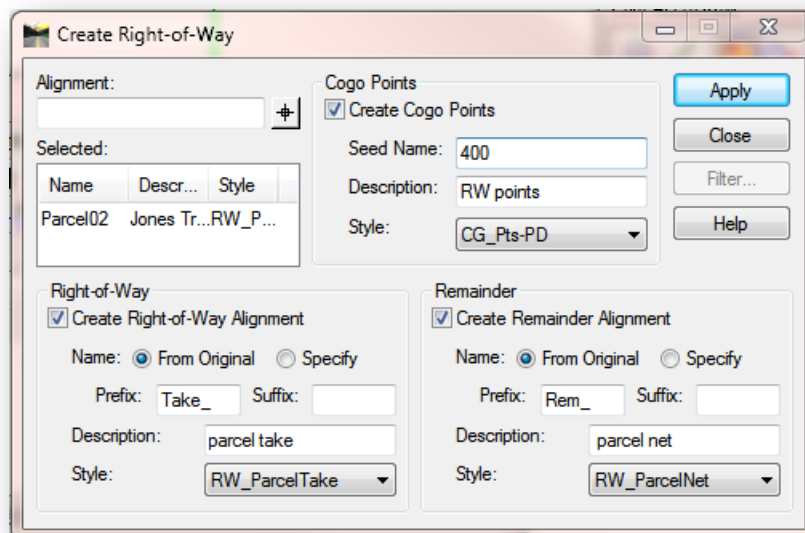


**Create Right-of-Way**

The Create-Right of Way tool allows for the graphical selection of closed alignments, or the multiple selection of closed alignments via the Filter option. The selection of multiple alignments allow for the quick processing of a series of parcels when the Right of Way line crosses them. Additionally, these tools are valuable for Right of Way processes for maybe types of projects including Permanent, Temporary, etc. In addition to this tool creating both the takes and the net/remainders; it can do the following:

- The Cogo Points section allows for the creation of new COGO points at the intersection of the parcel and the right of way alignment. The naming, description, and InRoads style can all be defined.
- The Right of Way section allows for the creation of the Right of Way alignment, while adding options for Prefixes and Suffixes. These are concatenated with the source name. Additionally the description and InRoads Style can be defined.
- The Remainder section allows for the creation of the net/remainder alignment, while adding options for Prefixes and Suffixes. These are concatenated with the source name. Additionally the description and InRoads Style can be defined.

In order to use the Right of Way tools, the parcel alignments must first be selected. With these showing in the Selected portion of the tool, settings for the Cogo Points, Right of Way and Remainder settings should be configured. The capture on the previous page shows an example of potential style names as they exist in the INDOT XIN file.

With the dialog configured, selecting Apply will send control back to MicroStation with a series of prompts in the status bar. These prompts are as follows:

1. Identify Right of Way line - This will be the graphical alignment illustrating the Right of Way.
2. Accept/Reject – A graphical preview of the resulting Right of Way alignment will be shown. Left Clicking will create the alignment using the parameters (prefix/suffix/style) as defined on the Create Right of Way tool. Right clicking will result in InRoads will flip the preview to the opposite side of the alignment for potential creation.

With the Right of Way and net/remainder alignments created, the next step is to review the finished alignments to verify that all values agree.

### 8.6-1   Horizontal Alignment Review

Horizontal alignment reports (Quick Reports) provide an opportunity to verify what has been created. As a follow up to creation of the alignments that are parcel takes, one might want to quickly verify the area of the parcels as well as the COGO points passed through. Quick reports are efficient ways to see this information prior to committing to creating documentation style reports.

To view a Quick Report, simply right click in the workspace bar on the alignment in question. From the context menu that appears, select Review. The quick report dialog will appear. Alternately the report can be generated from the *Geometry -> Review Horizontal* menu option.
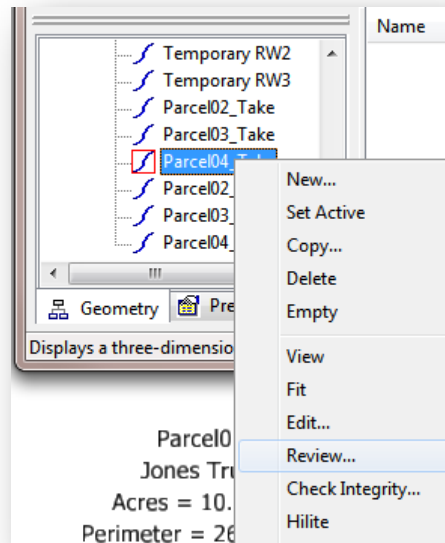
**Opening a Quick Report**
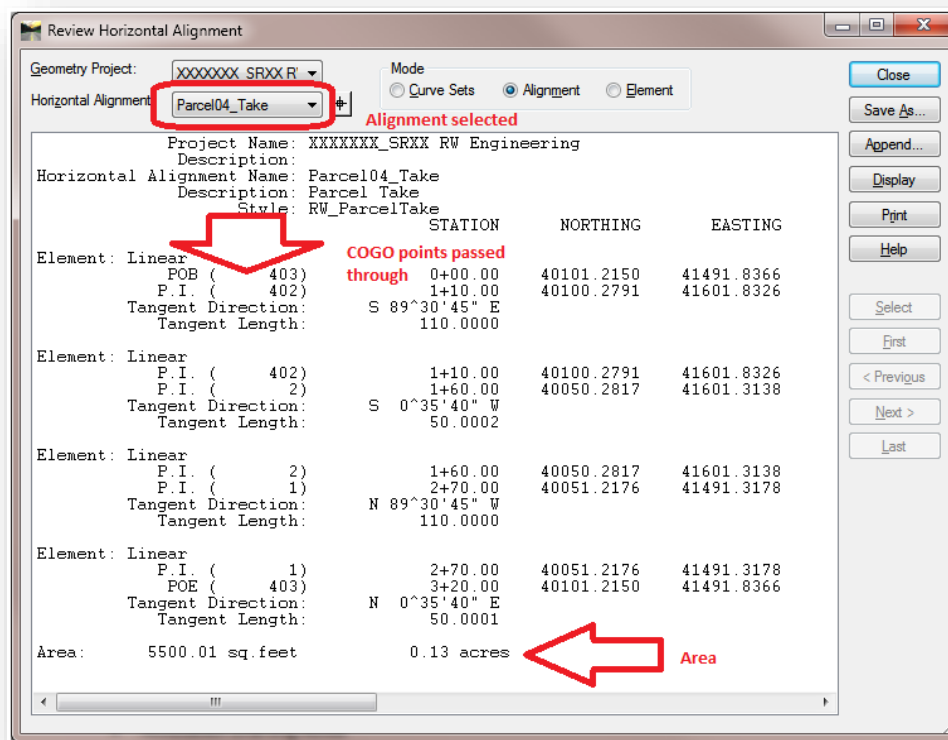


**Horizontal Alignment Quick Report**

## 8.7    Exhibit Creation

This section will review the process to create Exhibit documents using ProjectWise templates. This will leverage many of the processes spelled out earlier in this chapter, particularly information on retrieving data from other sources. While not specific to survey files, these procedures can be extended to gather other data such as the templates referred to throughout this section. As always it is recommended to always begin with the default template documents and not to carry project files from one project to the next

### 8.7-1a    Template Real Estate Documents

For Real Estate projects, a pair of document templates have been created to facilitate the creation of the Parcel Coordinate Charts and Exhibit documents. As with other templates, these can be found in ProjectWise under the Template Documents\Seed folder. Specifically, they are located under MicroSoft Office\Real Estate.
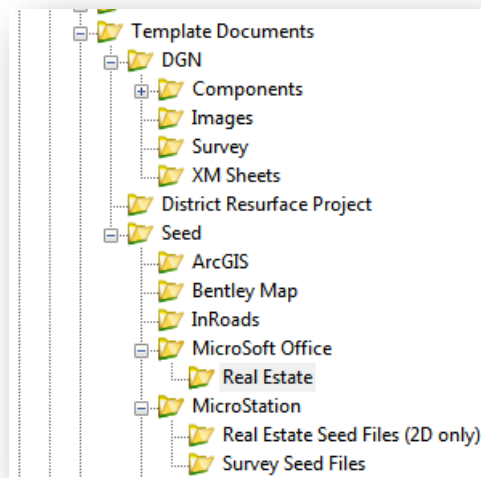


Real Estate Document Templates

The two template reside within the above folder



Real Estate Template Files

When working on Real Estate projects, these files should be copied in as needed. There may be instances where multiple copies of the template are needed throughout the life of the project and the files should be renamed accordingly to maintain consistency with other project data.

In addition to the template Microsoft Office documents, a template CAD file has also been created. This file contains standardized borders for both portrait and landscape Exhibit documents. Being a CAD based file, there are certain advantages that can be applied. With the model control in MicroStation, it's possible to host the Exhibit for each parcel in a single file as opposed to a file for each parcel. This cuts down on the required document management; however it will prevent multiple users from working on the same project CAD file at the same time. In this instance, appropriate care should be taken to determine the best workflow.

The Parcel_Plat_Templates.dgn can be found in ProjectWise under the Template Documents\Seed\MicroStation\Real Estate Seed Files (2D only) folder.
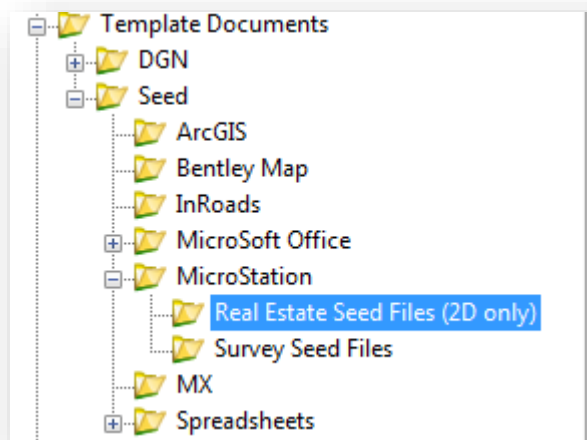


Read Estate CAD Templates

Included in this folder are a series of different files, each of which is described as follows:

- INDOT_SI_2Dseed.dgn – This is a 2d blank CAD file in metric units. This file should be used to draw up InRoads elements such as the alignments and parcels that are part of a project.
- INDOT_US_2Dseed.dgn - This is a 2d blank CAD file in imperial units. This file should be used to draw up InRoads elements such as the alignments and parcels that are part of a project.
- INDOT_US_SVFT_2Dseed.dgn - This is a 2d blank CAD file in US Survey Foot units. This file should be used to draw up InRoads elements such as the alignments and parcels that are part of a project.
- Parcel_Plat_Templates.dgn – This is the file containing the standardized Real Estate borders in both portrait and landscape orientations. The drawings containing the parcels should be referenced into these borders for sheet composition purposes and printing.
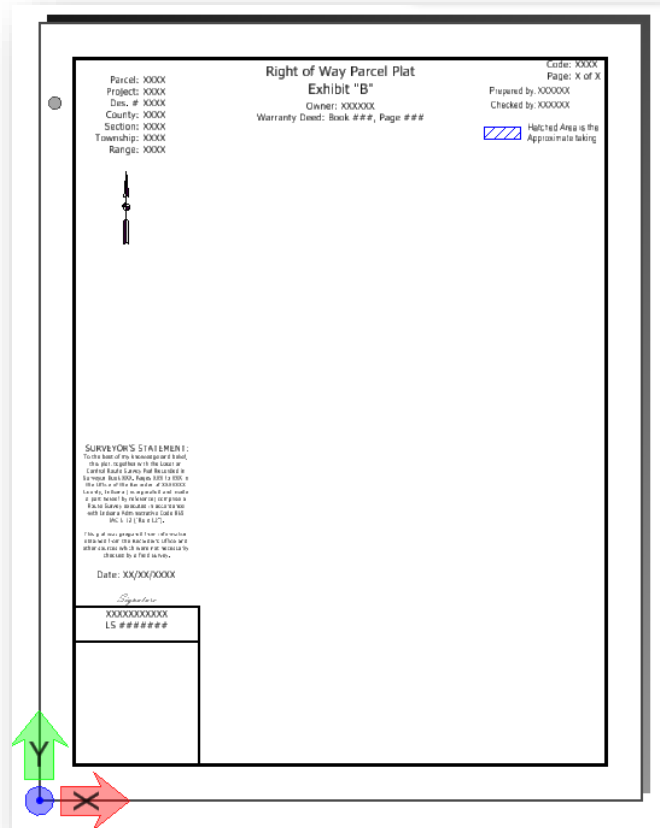
**Real Estate Portrait Border**

### 8.7-1b    Creating an Exhibit Drawings

The following examples will step through each of the major requirements for creating an Exhibit drawing using both InRoads, MicroStation, and ProjectWise.

#### THE BASE DRAWING

The first step in the creation of any exhibit is to start with a base drawing.  As referenced in the previous section, the appropriate seed file should be located from the Template Documents\Seed\MicroStation\Real Estate Seed Files (2D only) folder.  These documents can be copied into the Real Estate\InRoads folder under the appropriate des using the methods described in Chapter 2.8 – Creating New Documents.

With the base drawing created, it should then be opened in MicroStation and InRoads started from within the session.  Note that throughout the parcel creation and display process additional MicroStation Drawing models should be used to separate data.

#### VIEWING PARCELS/HORIZONTAL GRAPHICS

With a base drawing created, it is now time to start displaying the horizontal alignments that form each parcel. As part of the alignment display process, scaling should be considered and set accordingly using the InRoads Global Scale Factors tool as noted in Chapter 5.6 Global Scale Factors. With an appropriate scale selected, the following commands can all be used to display the alignment/parcel in the MicroStation display.

- *Right-Click, View* – This is performed by right clicking on the parcel name as it exists in InRoads Geometry tab. This will display the currently selected alignment. The same process can be reach through the *Geometry -> View Geometry -> Active Horizontal* menu option.
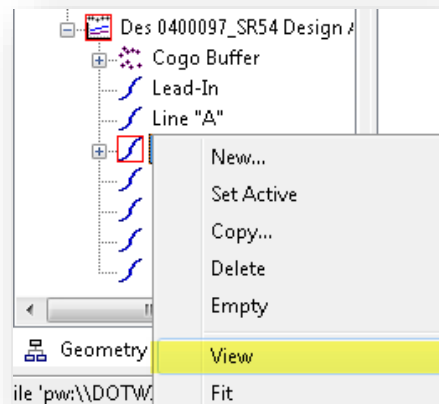


InRoads Geometry, Right Click View

- *Right Click, View All Horizontals* - This command will display all the horizontal alignments in the currently active Geometry project. It' is only available by right clicking on the name of the Geometry project. The same process can be found under the *Geometry -> View Geometry -> All Horizontals* menu option
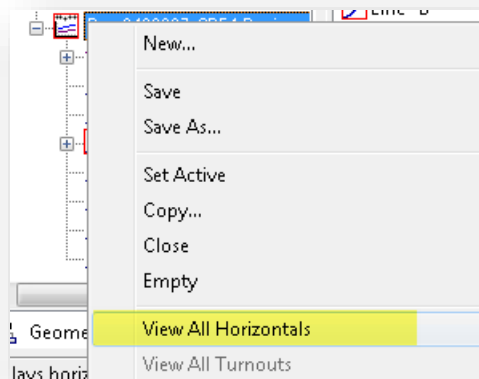


View All Horizontals

HORIZONTAL ANNOTATIONS

With parcels now displayed, annotation may be required to show items such as stationing, COGO point names, and alignment names. Three of the major annotation styles needed are described as follows:

- *Geometry -> View Geometry -> View Horizontal Annotation* – This command contains the bulk of the necessary annotation tools needed throughout the Exhibit creation process. To ease in the usage of this tool, numerous Preferences have been created specifically for Real Estate use and can be accessed through the Preference button on the lower edge of the panel.
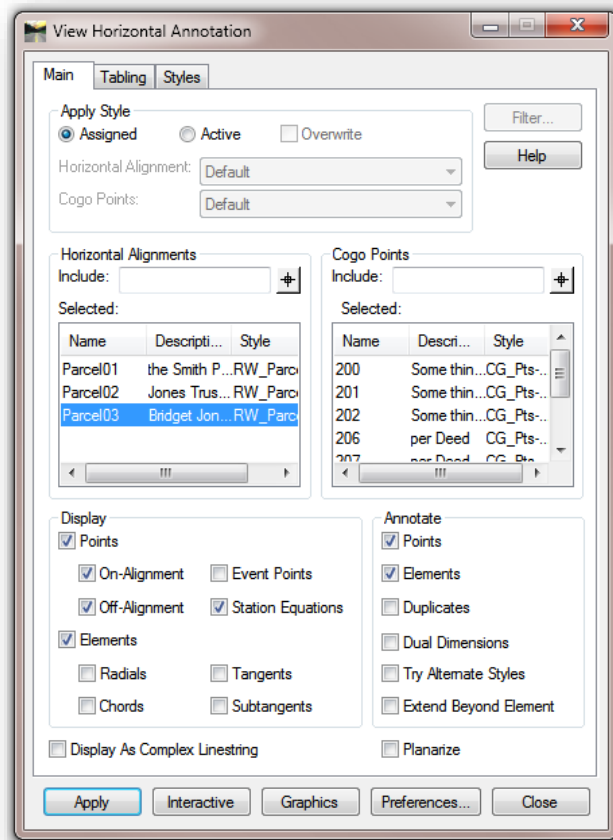


View Horizontal Annotations

- *Geometry -> View Geometry -> Stationing* –This tool is used to display the stationing on the design alignment.
- *Geometry -> View Geometry -> View Curve Set Annotation* – Curve set annotations places annotations on horizontal curves. This is highly useful for displaying Degree of Curve, Radius, etc.
- *Geometry -> View Geometry -> View Closed Areas* –This command places area annotations on closed alignment elements.

## REFERENCING PARCEL MODELS TO EXHIBIT BORDERS

With the parcel drawn and annotated, it's now time to reference this data together with the appropriate border.  As discussed previously in this chapter, this can be handled multiple ways.  For this example, a model import/referencing process will be reviewed.  Additionally, a separate DGN could be used with referencing.

1. To start this process, the first step will be to make sure that the base drawing with the annotated parcel models is open and prepared.  InRoads is not required for this step, and does not need to be (or remain) open.
2. In MicroStation, locate the Models button on the Primary Tools toolbar.  It can also be found under the *File -> Models* command in the MicroStation menus.



Models Button

3. With the Models dialog open, select the Import Model button.  When prompted, navigate to a copy of the Parcel_Plat_Templates.dgn that is either in the Template Documents or that has been copied into your project.
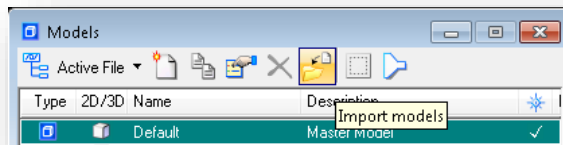


Import Models

4. This will open the Select Models dialog where the appropriate borders can be pulled from. Note that multiple models can be selected, and this can be performed multiple times to get the appropriate number of borders for each parcel.  With the appropriate border selected, hit OK.
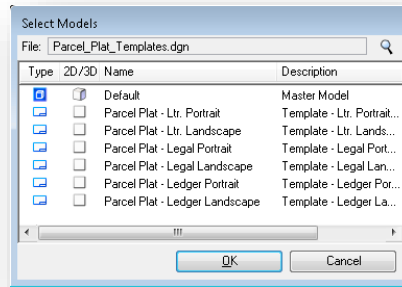
**Select Models**

5. Upon completion of the border import, the appropriate border should be made the active model by double clicking it's entry in the Models dialog.
6. With the border model now imported in and selected, the referencing process can begin. This is initiated by selecting the References button from the Standard toolbar.
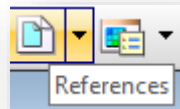


**References**

7. This will open the References dialog, allowing for the attachment of other models or sheets from the current or other DGN. For the purposes of this example, referencing two models from the same DGN will be reviewed.
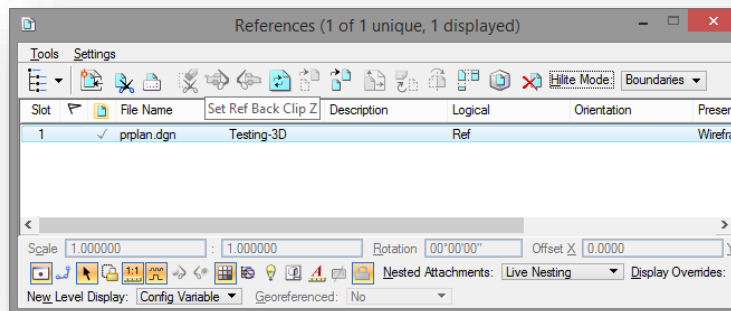


**The References Dialog**

8. Continuing from the previous instructions, both the Models and References dialogs should be open. As the models being referenced are in the same file, a simple drag and drop of the appropriate model from one dialog to the other will initiate the attachment process.
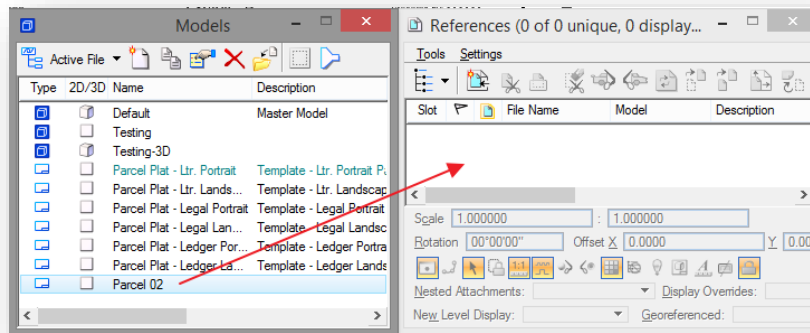
**Drag and Drop Referencing**

9. Once the parcel model is attached, the Attach Source Files dialog will appear, requesting feedback on how the model should be attached.  As additional adjustments are required to get the parcel to fit, the Interactive method should be used.
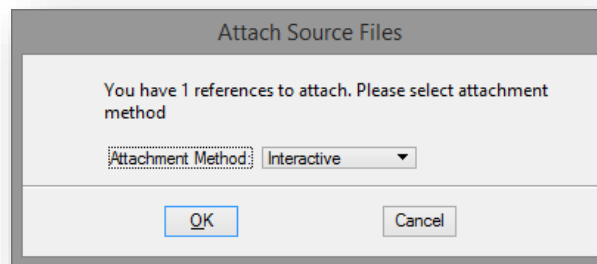


**Attach Source Files**

10. Selecting Interactive allows for the configuration of additional attachment settings prior to final attachment placement.  Note that many of these settings can be adjusted to acquire the desired results.  The following screen capture shows an example where the parcel will be aligned to the border, with a 1"=100' scale.  As each deliverable is different, these settings should be adjusted as needed.
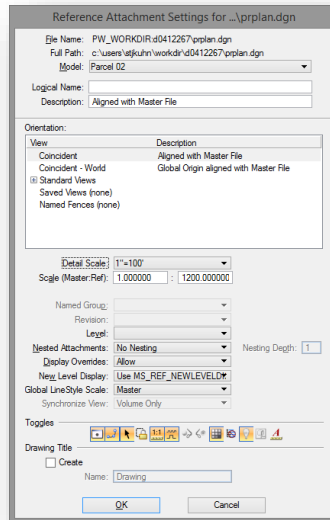
**Reference Attachment Settings**

11. At this time, the parcel will be attached to the border using the provided scale and orientation, and in most instances will require movement to fall in the appropriate location on the border.  To do so, select the Move Reference tool from the References dialog toolbar.
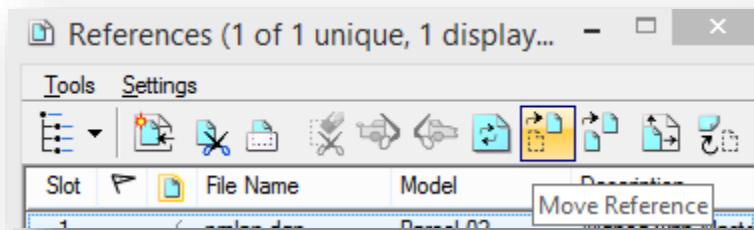


**Move References**

12.  The parcel should then be moved to the appropriate location within the border.  Further adjustments to scaling or placement could be necessary and should be changed using the tools above.  Further parcels/exhibit sheets can be created by repeating the above steps as needed.

## ANNOTATIONS AND DRAFTING NOTES

Annotation of any InRoads Geometry is available from the usage of the InRoads Plan Drafting notes. The behavior of these tools is covered elsewhere, in documentation such as the InRoads ROW Fundamentals.

## 8.8      InRoads Reporting

### 8.8-1   InRoads and Excel – Parcel Coordinate Charts

We will examine a method of creating Parcel Coordinate Charts using a combination of InRoads XML Reports and Excel.

Included with each InRoads installation, a customized XML for the parcel coordinate chart has been added. This report will provide a listing of points in a parcel, along with the name, reference alignment, station, offset, northing and easting.  For added flexibility, we have also created an Excel workbook that will process InRoads Report data and provide the correct formatting.  Using Excel in the method will create a mechanism to edit various aspects of the documentation without the inflexibility of highly customized report.

#### 8.8-1a      The Parcel Coordinate Chart Report

In order to generate the parcel coordinate chart, a modified version of the InRoads clearance report is provided that provides the required information.  With an alignment and parcel created, the XML reporting tools will need started in order to acquire our information.

In order to start the clearance reporting tools, navigate on the InRoads Explorer to Tools -> XML Reports -> Clearance... as shown in the following illustration.
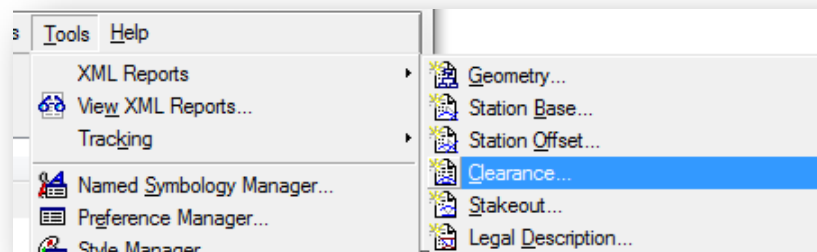


**Clearance Reporting**

With clearance report dialog now open, the appropriate data fields need populated.  First is the General leaf.  The information on this leaf defines the mainline alignment to derive the parcel coordinates from, along with what points in particular should be reported.  In the following illustration, one can see that for this particular data set, the mainline alignment is defined as Line "A".
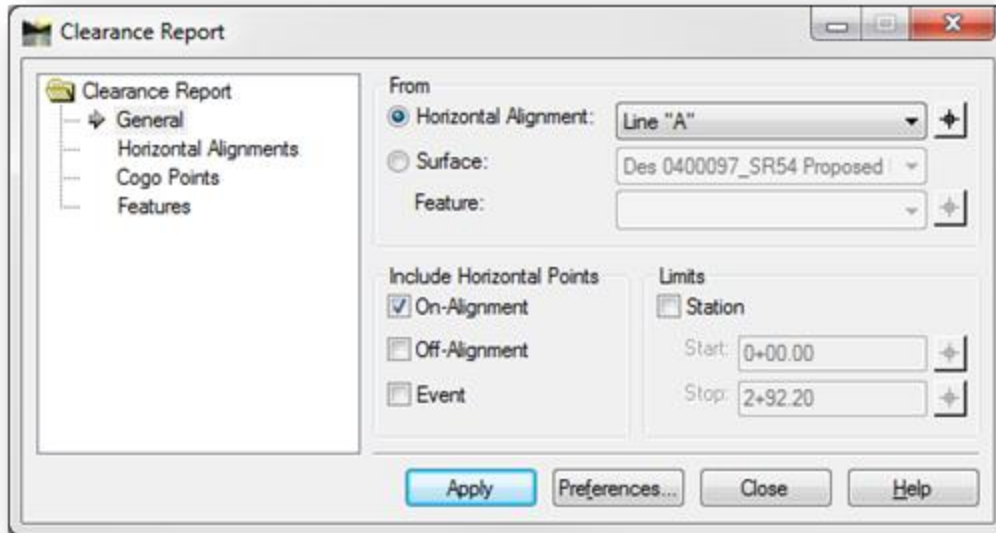
**Clearance Report Dialog**

Additionally, as shown, the Include Horizontal Points option has On-Alignment points enabled.  This will have the report provide the point information required.

Next, we need to define our parcels on the Horizontal Alignments leaf. There are two methods that can be used to select your parcel.  The first is through the usage of the graphical selector.  The second is the use of the Geometry Selection Filter. Briefly reviewing this tool, place your cursor in the Include box.  This will enable the use of the Filter button.
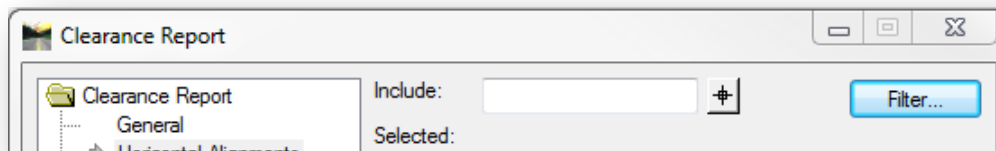


**Filter Button**

Clicking on the Filter button will bring up the Geometry Selection Filter.  For this dataset, Parcel 1 will need moved from the Available to the Selected side of the dialog.  This is done by highlighting the appropriate alignment and then selecting the Add button in the middle.
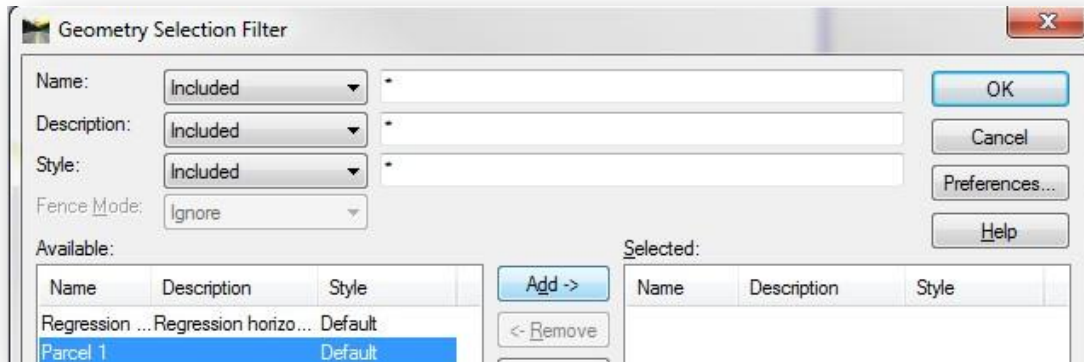
**Geometry Filters**

With the parcel alignment moved over, select OK to confirm the alignments.  This will then populate the Horizontal Alignments leaf.

As a reminder, nothing should be selected on either the COGO Points or Features tab. When you're satisfied with the setup of the report, select Apply, which will kick off the InRoads Report Browser with the default Clearance report selected.
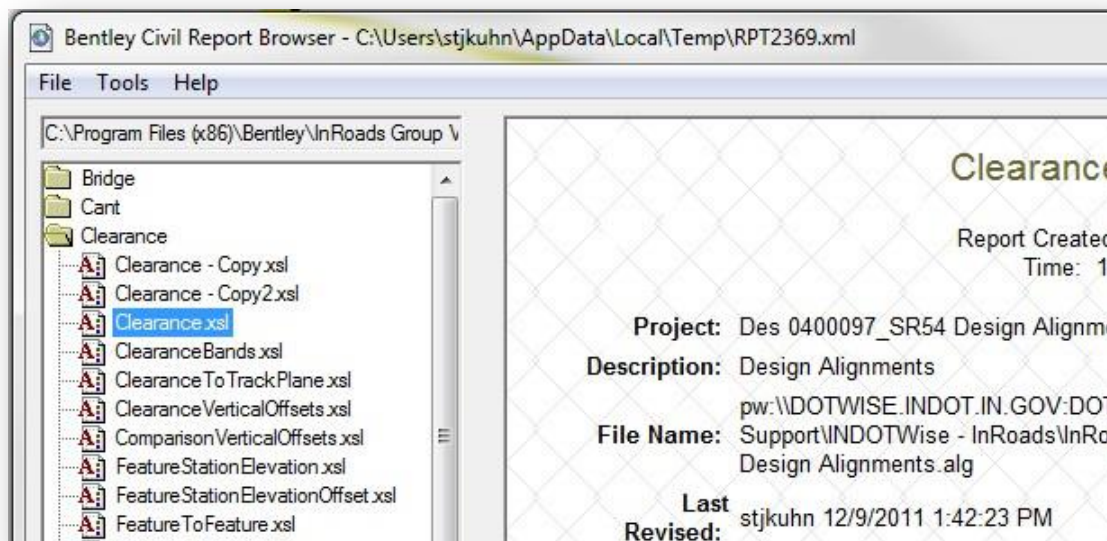


**Clearance Report Example**

For the purposes of the Parcel Coordinate Chart, this is not the appropriate report, however the framework for the Clearance report provides the majority of the relevant information.  To streamline the coordinate chart creation, a customized report has been provided under the INDOT Real Estate leaf in the Report Browser.
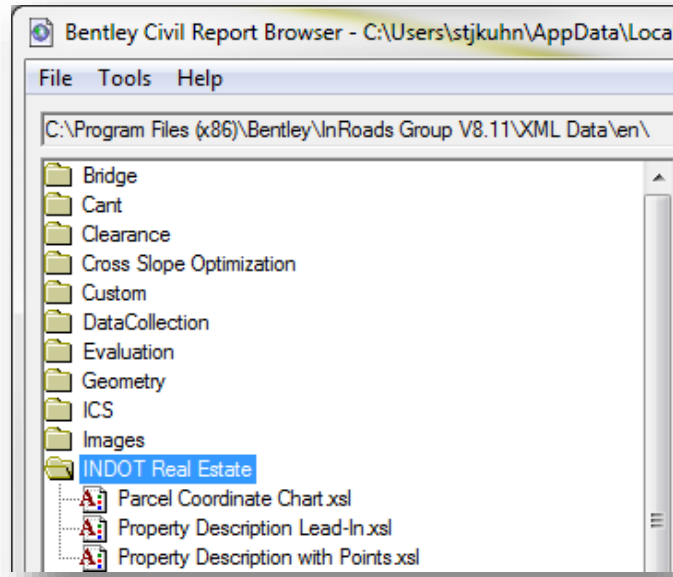
**INDOT Real Estate Reports**

There are additional report types provided in this location that will be discussed later in this chapter. For right now, the Parcel Coordinate Chart report will provide a table that can be sent to Excel for formatting and placement back into the DGN.

With the Parcel Coordinate Chart selected, one will see something similar to the following.



**Parcel Coordinate Chart**

Report Created: 12/9/2011
Time: 1:51pm

Project: Des 0400097_SR54 Design Alignments
Description: Design Alignments
File Name: pw:\\DOTWISE.INDOT.IN.GOV:DOTWISE\Documents\Resources\CAD Support\INDOTWise - InRoads\InRoads Sample Project Data\0400097_SR54 Design Alignments.alg
Last Revised: stjkuhn 12/9/2011 1:47:14 PM
Centerline : Line "A"

Note: All units in this report are in feet unless specified otherwise.

| Parcel Alignment: Parcel 1 | | | | | |
|---|---|---|---|---|---|
| Point Name | Centerline | Station | Offset | Northing | Easting |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |
|  | Line "A" |  |  | 15454.3637 | 13883.1816 |
| 15001 | Line "A" | 2+12.28 | 81.01 | 15374.0033 | 13750.3329 |
| 15002 | Line "A" | 1+42.00 | 86.86 | 15351.6592 | 13685.2802 |
| 15003 | Line "A" | 1+35.29 | 15.64 | 15419.0835 | 13661.3753 |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |

**Parcel Coordinate Chart**

The preceding screen capture shows the full report, which can be sent to a variety of formats for use in other documents. Instead of using one of these differing formats, this content of this chart will be copied to the Windows. In particular, all the data from the leftmost column, first row under the Point Name heading, to the last row, rightmost column available should be copied as shown.

| Point Name | Centerline | Station | Offset | Northing | Easting |
|---|---|---|---|---|---|
| Parcel Alignment: Parcel 1 | | | | | |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |
| | Line "A" | | | 15454.3637 | 13883.1816 |
| 15001 | Line "A" | 2+12.28 | 81.01 | 15374.0033 | 13750.3329 |
| 15002 | Line "A" | 1+42.00 | 86.86 | 15351.6592 | 13685.2802 |
| 15003 | Line "A" | 1+35.29 | 15.64 | 15419.0835 | 13661.3753 |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |

Parcel Coordinate Copy

With this data selected, copying the data to the clipboard can be accomplished by using the Window shortcut key Ctrl+C or the rt. click Copy command. With the copy completed, this next steps are to adjust the data into a usable format for the exhibit drawing.

### 8.8-1b    Parcel Coordinates in Excel

Even though the InRoads report appears to have the appropriate formatting, it cannot be directly pasted into the Exhibit drawing. MicroStation interprets this formatting using its own formatting which is inconsistent from the formatting required. To resolve this issue, each Real Estate template has an Excel workbook under the Real Estate\Documents folder named Parcel Coordinate Chart.xlsm. Alternatively, template copies can be found in ProjectWise under the Template Documents\Microsoft Office\Real Estate location in ProjectWise. It's recommended that you make a new copy of this file each time you need a new parcel coordinate chart and rename it appropriately.

*Note: This is a macro-enabled workbook, which may give a security warning upon opening in Excel. Testing has shown that this should not be an issue on standard user accounts, however if errors or messages regarding the macros are encountered, please contact CAD Support for assistance.*

With a new, appropriately named copy of the Parcel Coordinate Chart workbook, open the file in Excel by double clicking on the file in ProjectWise and checking it out. In the Excel workbook two sheets are available.

Parcel Coordinate Chart / Paste Coordinate List Here
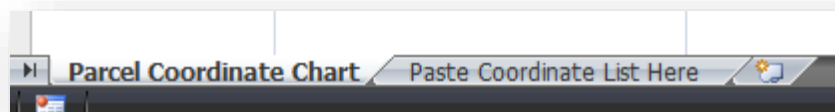
Parcel Coordinate Sheets

The first sheet, Parcel Coordinate Chart is where to get the finished formatting from.  The second sheet, Paste Coordinate List Here, is where the table data copied to the clipboard from the InRoads XML report will be pasted.

First, we need to navigate to the Paste sheet. As shown, place your cursor in cell A1, where the text reads "Place Here".
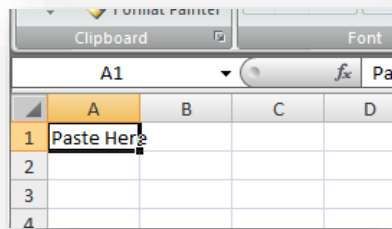


Paste Coordinates Here

Next, paste the contents of the clipboard at this location.  This can be done either by using the shortcut key *Ctrl+V*, or using the Paste button the Home ribbon. After the table is pasted, the sheet will look similar to the following.



Pasted Parcel Coordinates

Next, navigate back to the first sheet, the Parcel Coordinate Chart.  On this sheet, formatting more appropriate for pasting into the plat will be available. This data isn't yet in the appropriate format yet. The two buttons along the right side of the sheet will bring this data in, format it, and then allow for it to be placed back on the clipboard to paste into MicroStation.

First, select the Create Parcel Table button, this will bring all the information from the second sheet into our table and format it correctly.  As there may be some editing required on this sheet, make any adjustments, such as the information regarding the Route Plat location as needed.

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | | | Parcel Coordinate Chart (shown in Feet) | | | | | |
| 2 | Point | Line | Station | Offset | Northing | Easting | | Create Parcel Table |
| 3 | 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 | | |
| 4 | | Line "A" | | | 15454.3637 | 13883.1816 | | |
| 5 | 15001 | Line "A" | 2+12.28 | 81.01 | 15374.0033 | 13750.3329 | | Copy Table to Clipboard |
| 6 | 15002 | Line "A" | 1+42.00 | 86.86 | 15351.6592 | 13685.2802 | | |
| 7 | 15003 | Line "A" | 1+35.29 | 15.64 | 15419.0835 | 13661.3753 | | |
| 8 | 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 | | |
| 9 | NOTE:  Stations and Offsets control over both North & East coordinates and Bearings & Distances. | | | | | | | |
| 10 | * See the Location Control Route Survey Plat recorded in Book XX Page XXX in the Office of the Recorder of XXXXXX County. | | | | | | | |
| 11 | ** Additional calculated corner information from other records. | | | | | | | |

**Processed Parcel Coordinate Chart**

With the table created and adjusted, it can now be placed back on the clipboard. At this time, the Copy Table to Clipboard button can be selected. With the Excel table ready to be pasted, switch back to MicroStation, and to the Parcel Plat model which it belongs on.

As with the Excel process, one needs to paste the chart back into MicroStation.  The same paste commands are available as in Excel (*Ctrl+V* or *Edit -> Paste*).  With the paste command active, a MicroStation command window for Paste OLE Object will be displayed.  MicroStation has the appropriate knowledge of what type of information that is being pasted into the file.  Shown below, are the recommended settings for pasting the chart.  The other options can be used, but do require additional configuration outside the scope of this procedure.  Of particular importance, one needs to verify the Method is set to "By Size" and selecting the expand button on the panel, make sure Scale is set to 1.0. As always, the chart should be rotated relative to the sheet, Rotate With View should be disabled.
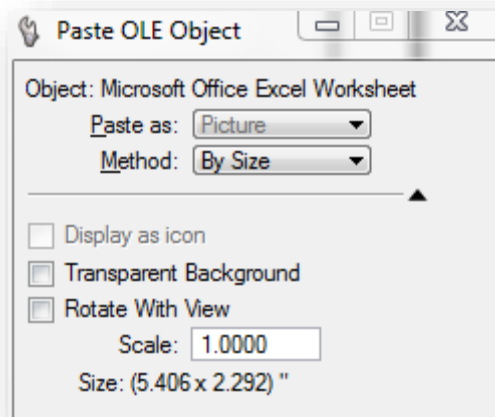


**Paste OLE Object**

At this time, a rectangular outline of the chart extents will be displayed in MicroStation and follow the cursor.  These extents should be set to an appropriate location, and confirmed by a lt. click.
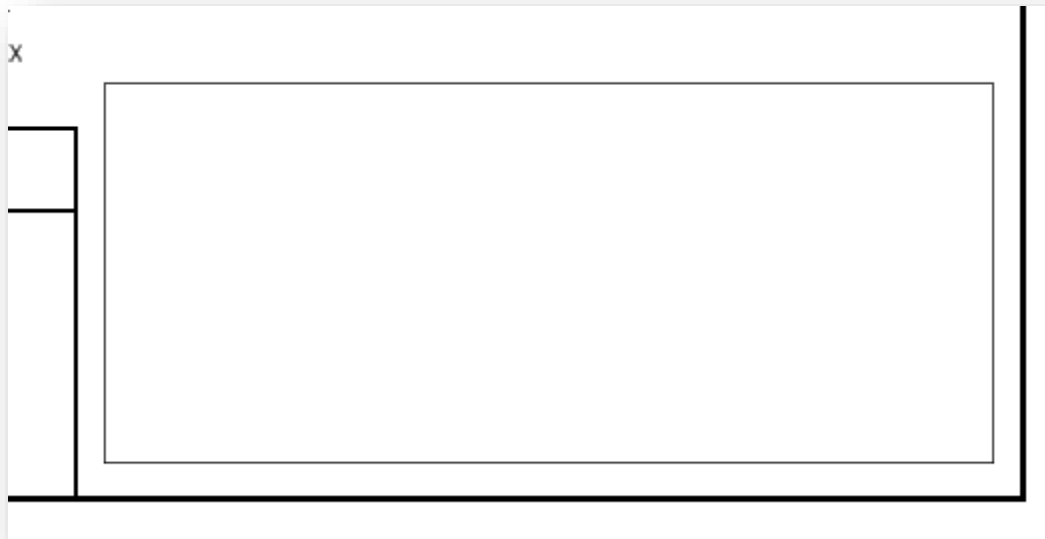
Paste Extents



checked by a field survey.

Date: XX/XX/XXXX

Signature
XXXXXXXXXXXX
LS #######

| Parcel Coordinate Chart (shown in Feet) | | | | | |
|---|---|---|---|---|---|
| Point | Line | Station | Offset | Northing | Easting |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |
| | Line "A" | | | 15454.3637 | 13883.1816 |
| 15001 | Line "A" | 2+12.28 | 81.01 | 15374.0033 | 13750.3329 |
| 15002 | Line "A" | 1+42.00 | 86.86 | 15351.6592 | 13685.2802 |
| 15003 | Line "A" | 1+35.29 | 15.64 | 15419.0835 | 13661.3753 |
| 15000 | Line "A" | 2+05.62 | 13.95 | 15437.8996 | 13729.1712 |

NOTE: Stations and Offsets control over both North & East coordinates and Bearings & Distances.

* See the Location Control Route Survey Plat recorded in Book XX Page XXX in the Office of the Recorder of XXXXXX County.

** Additional calculated corner information from other records.

Pasted Parcel Coordinate Chart

With the chart pasted, the files can now be saved, closed, and checked in; and this procedure should be repeated as necessary for additional parcels.

A few items to note throughout this procedure:

- If there is a need to recreate the chart in Excel and it has already been used with the Create Parcel Table button to bring over the data and reformat it, delete the row that are brought over from the second sheet. Make sure the chart header and footer information is left.
- The pasted picture of the table can be modified in MicroStation like any other element. Moving, stretching and other element functions can be used in the usual manner.

- One can report the coordinates on multiple Parcels by selecting them for reporting. Remember that the report is not automatically saved, so if this function is used, it is beneficial to save the report to another format so it can be reused at a later time.
- As a reminder, the Excel workbook is macro-enabled, so any errors should be reported to CAD Support.

### 8.8-2   InRoads and Word – Exhibit "A"

In addition to the tools used to generate the Parcel Coordinate Chart, CAD Support has also included customized reports to assist in the creation of Exhibit "A" documents. Like the coordinate chart, these reports will be used to generate the appropriate information for use in other documents.

#### 8.8-2a      The Property Description Reports

With our data open from the previous section, again navigate to the *Tools -> XML Reports* menu on the InRoads Explorer.  For the report type in this section, select Legal Description...
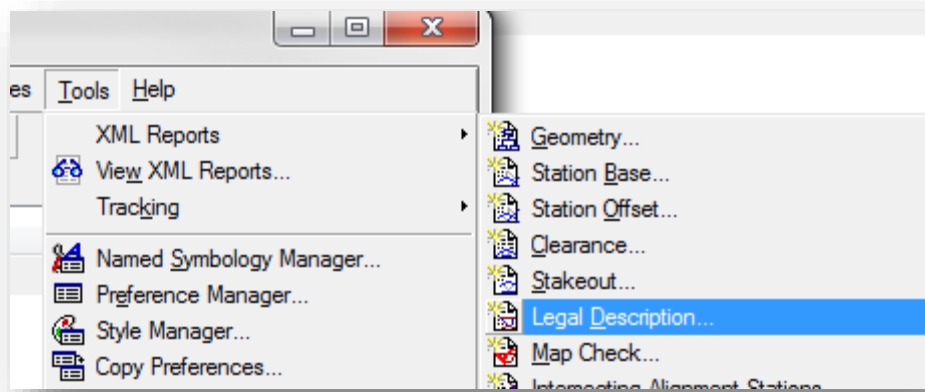


**Legal Description Reports**

This will present the Legal Description Report dialog.  As done in previous sections, the relevant parcel should be selected in the Alignments section.  This can be accomplished either by a graphical selection or by using the InRoads Filter dialog option. With the parcel selected, the dialog will look similar to the following:
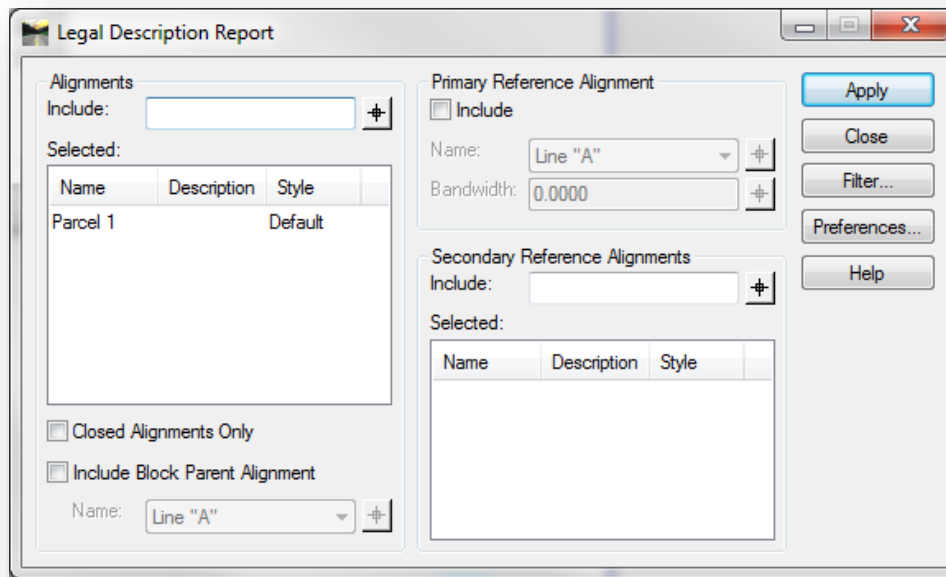
Legal Description Report

Remember that multiple legal descriptions can be generated by adding additional parcels to the Selected section of the dialog prior to selecting Apply. Once satisfied with the report configuration, the Apply button should be selected to start the Bentley Civil Report browser with the default report selected.
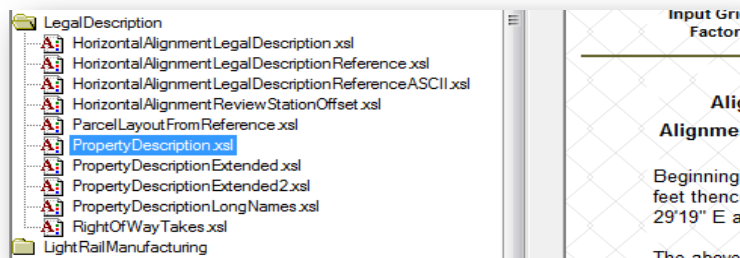


Default Legal Description Report

This report does provide the basic information required, however it does not reflect the appropriate INDOT formatting and verbiage. As with the coordinate chart, navigate in the InRoads Report Browser to the INDOT Real Estate folder, this time selecting the Property Description with Points report.
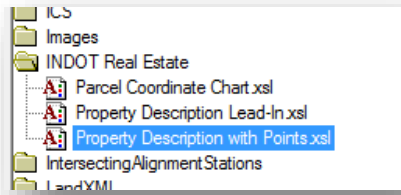
**Property Description with Points**

This report is configured to adhere to INDOT wording standards and is setup for placement directly into a Word document template.



**INDOT Property Description**

Report Created: 12/12/2011
Time: 10:42am

**Project:** Des 0400097_SR54 Design Alignments
**Description:** Design Alignments
**File Name:** pw:\\DOTWISE.INDOT.IN.GOV:DOTWISE\Documents\Resources\CAD Support\INDOTWise - InRoads\InRoads Sample Project Data\0400097_SR54 Design Alignments.alg
**Last Revised:** stjkuhn 12/12/2011 7:25:08 AM
**Note:** All units in this report are in feet unless specified otherwise.

**Alignment Name:** Parcel 1
**Alignment Description:**

Beginning at the point designated "15000" on the attached Right of Way Parcel Plat marked Exhibit "B" and the POINT OF BEGINNING ; thence North 83 Degrees 53 Minutes 53 Seconds East a distance of 154.89 feet; thence South 58 Degrees 49 Minutes 49 Seconds West a distance of 155.26 feet to the point designated "15001" on said Plat ; thence South 71 Degrees 02 Minutes 37 Seconds West a distance of 68.78 feet to the point designated "15002" on said Plat ; thence North 19 Degrees 31 Minutes 18 Seconds West a distance of 71.54 feet to the point designated "15003" on said Plat ; thence North 74 Degrees 29 Minutes 19 Seconds East a distance of 70.36 feet and the POINT OF BEGINNING; said described tract contains 0.228 acres (9920 sq. ft.), more or less.

**Property Description Report**

With the report generated, we will now copy the parcel description text to our clipboard as we did with the coordinate chart. The following illustration shows the area where the text will be selected from:

Property Description Copy to Clipboard

Next, place this data on the clipboard either by using the shortcut keyin *Ctrl+C*, or rt. clicking on the selected text and select copy. With the text on the clipboard it can now be placed into the Exhibit "A" template Word document.

### 8.8-3  Parcels with a Lead-In

Due to limitations in the InRoads reporting tools and formatting, if a Lead-In alignment exists for the selected parcel, the Property Description Lead-In report will need used in addition to the preceding report for the Parcel.  This report is again formatted specifically to adhere to INDOT verbiage for a Lead-In alignment.  The process for acquiring this report is identical to the previous example, instead of selecting the parcel however, select the lead-in alignment.  This will then be combined with the text from the parcel report to generate the finished Exhibit "A".  Please be aware that one will need to adjust wording between the two reports as some information may be duplicated, or incorrect depending on the circumstance.

### 8.8-4  The Exhibit "A" Word Document Template

To conform with the appropriate INDOT Exhibit "A" form and to provide as much flexibility as possible, each real estate project has a copy of the Exhibit "A" Word document template. As with the Excel workbook discussed earlier, this file can be found under the Real Estate\Documents folder of a project, or in ProjectWise under the Template Documents\Microsoft Office\Real Estate location. As with the coordinate chart, it is recommended to create a copy of this document for each parcel being generated either from the one provided or from the template location.  It's again recommended to rename subsequent copies as necessary to keep track of what parcel each document contains.

Navigating to the Real Estate\Documents folder, double click on the Exhibit A Template.docx document, checking it out and opening it for editing.

EXHIBIT "A"

Project:                                        Sheet  X  of  X
Code:
Parcel:
Key No.
Form:

Paste Parcel Report Here

This description was prepared from information obtained from the Recorder's Office and other sources
which were not necessarily checked by a field survey.

This description was prepared for the
Indiana Department of Transportation
by XXXXX,
Indiana RLS # XXXXX this DD day of MM, YYYY.

_____
XXXX, MM/DD/YYYY

**Exhibit "A" Legal Description**

Shown above, the Exhibit "A" has numerous areas where data either needs typed in, or edited from the existing.  The first item, however, is the pasting of the legal description from the InRoads report.

Located in the body of the document, find the text "Paste Parcel Report Here" and select it so the report data can be pasted over it. When selected, one can either use a *Ctrl+V* to paste the text directly in, or you can use the Paste button on the ribbon. Depending on the method used, there will be supplemental steps required to match the formatting.

### 8.8-5   Using the Word Paste Button

To easily match the formatting of the existing text, the Paste button the ribbon provides the preferred method.  Selecting the drop arrow below the clipboard button will provide a menu with the following options:



**Paste Special**

For this example, one should use the Paste Special... option.  Once the dialog is presented, select the Unformatted Text option.  This will have Word strip all formatting off the clipboard text from the report and use the existing formatting present.
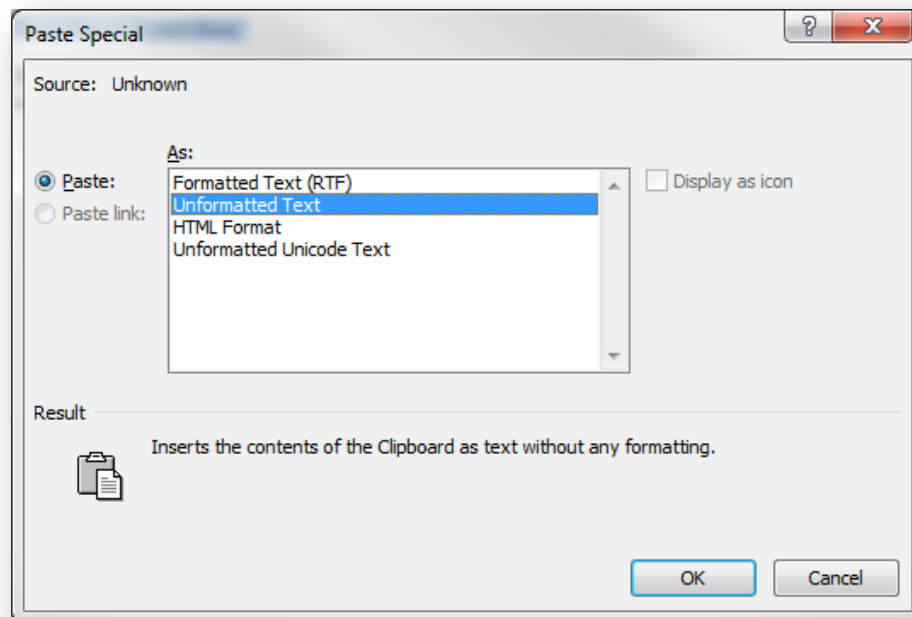


**Paste Special**

### 8.8-6   Rt. Click /Ctrl+V Pasting

Alternatively, one can use either a rt. click or the Ctrl+V shortcut key to paste the legal description. Should this method be used, the existing formatting must be matched.

As illustrated, when initially pasted in, the text is rather small, in Arial and not italicized.  This is the formatting provided by the InRoads report. After initially pasting this information in, one will see a small clipboard after the last character pasted.
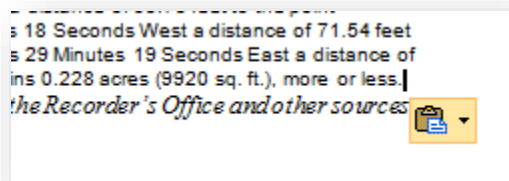


**Pasting Method**

By selecting this drop menu, one can then determine the appropriate formatting to be used. In this instance, the Match Destination Formatting option should be used; this will cause the text to assume the existing formatting in the correct manner.

As this method is only available immediately after the text is pasted, it is entirely possible to miss the opportunity to adjust the text in this manner.  Should this happen, one could then use the Format Painter tools to match the format.  To use this, place the cursor in a section of text that matches the formatting needed, for this example, the line of text at the bottom of the body can be used.  Next, select the Format Painter tool on the Home ribbon:
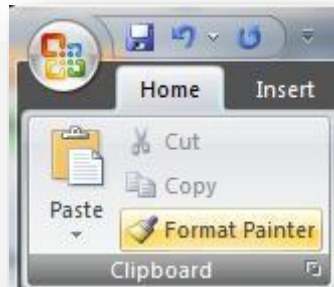


Format Painter

After selecting the tool, one needs to then highlight the text and then select the text that should be changed to the new format.  This will adjust the text as necessary.

### 8.8-7   Exhibit "A" Title and Signature

To ease the entry of data into the title and signature areas of the Exhibit A, CAD Support has modified the document to use embedded tables for text alignment.  In the title area, if one enables the borders, it would look similar to the following:



Table with Borders Enabled

Every field is editable, and prior to completion, one should fill them out as needed.  The default template doesn't have the borders enabled, but the cells are aligned so that one should be able to easily pick where to enter data.

The signature area behaves in much the same way. With the cell borders turned on, the alignment is as shown:

*This description was prepared for the*
*Indiana Department of Transportation*
*by XXXXX,*
*Indiana RLS # XXXXX this DD day of MM, YYYY.*

_____
*XXXX, MM/DD/YYYY*

**Signature Block with Borders Enabled**

The cell on the right is for the placement of the PE/LS stamp using imagery included in ProjectWise. To insert the PE/LS Stamp, use the Insert/Picture on the ProjectWise ribbon tab with the cursor in the appropriate location.



**Pasting Pictures from ProjectWise**

This will open the ProjectWise browser where one can select your PE/LS Stamp image. These can be found in the INDOT Workspace\PE Stamp Images folder. If a stamp doesn't exist, please contact CAD Support with the information so one can be created.

At this time, select the appropriate stamp and hit open, this will place and appropriately sized image of the stamp. The remainder of the items on this sheet should be edited by hand, as the InRoads reporting tools cannot take this information into account.

Upon completion, the Exhibit should look similar to the following:

EXHIBIT "A"

Project: 1234567                                    Sheet   1 of 1
Code:    XXXX
Parcel:  XXXX
Key No.  XXXX
Form:    XXXX

*Beginning at the point designated "15000" on the attached Right of Way Parcel Plat marked Exhibit "B" and the POINT OF BEGINNING ; thence North 83 Degrees 53 Minutes 53 Seconds East a distance of 154.89 feet; thence South 58 Degrees 49 Minutes 49 Seconds West a distance of 155.26 feet to the point designated "15001" on said Plat ; thence South 71 Degrees 02 Minutes 37 Seconds West a distance of 68.78 feet to the point designated "15002" on said Plat ; thence North 19 Degrees 31 Minutes 18 Seconds West a distance of 71.54 feet to the point designated "15003" on said Plat ; thence North 74 Degrees 29 Minutes 19 Seconds East a distance of 70.36 feet and the POINT OF BEGINNING; said described tract contains 0.228 acres (9920 sq. ft.), more or less.*

*This description was prepared from information obtained from the Recorder's Office and other sources which were not necessarily checked by a field survey.*

*This description was prepared for the
Indiana Department of Transportation
by XXXXX,
Indiana RLS # XXXXX this DD day of MM, YYYY.*

XXXXXXXXX
XXXX, MM/DD/YYYY

Sample Exhibit Sheet

With the legal description pasted, the file can now be saved, closed, and checked in and then repeated to create additional Exhibits as necessary.  One can report the coordinates on multiple Parcels by selecting them for reporting.

## 8.9    Report Settings - Unit Format and Report Defaults

In the previous sections, discussion has looked at procedures for generating different InRoads reports and their associated documents using customized reports.  In either situation, one may notice that InRoads may have sent them to a specific report, or that unit readout may have been incorrect.  The following sections discuss how to adjust these settings should one like to incorporate the customized reports as defaults and adjusting unit readouts.

### 8.9-1   Default Reports

Each InRoads report type under the *Tools -> XML Reports* menu item has a corresponding report default in the InRoads report browser. Depending on function, one may wish to change these to a more suitable report for the workflow.

The first step is to open the InRoads report browser using the *Tools -> View XML Reports*... tool on the InRoads Explorer.  This will start the report browser without the need to actually create and configure a report. With the report browser now open, one can now navigate down to the INDOT Real Estate folder in the report browser and set the reports to the default report types when running Clearance or Legal Description reports.

To start, set the Parcel Coordinate Chart report as the default clearance report. With the browser open to the appropriate location, rt. click on the Parcel Coordinate Chart.xls, which will present a list of menu items, and then select Set as Default Clearance.
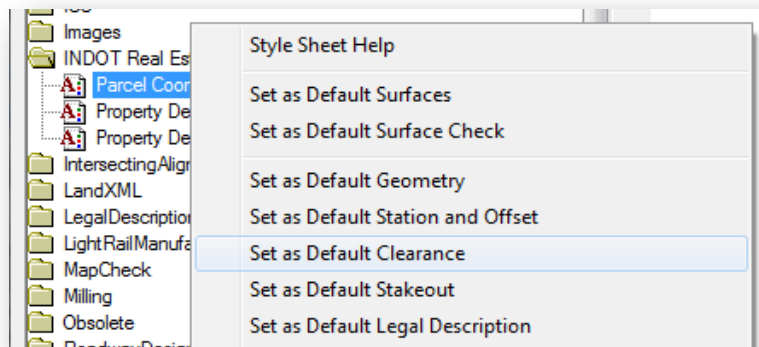


Setting Default Reports

By doing this, each time one run a Clearance report from the *Tools -> XML Reports -> Clearance...* tool, the Parcel Coordinate Chart will be the first report option taken to in the browser. Be aware that the reporting is dynamic, so even though InRoads will send one to the default report defined, it can select different reports which will automatically be updated based on the previously defined criteria. This will only work if the reports are for the same tools, so in this case one would only get data on.

In regards to the Exhibit A/Legal Description, one would perform the same procedure only assigning one of the Property Description reports under the INDOT Real Estate folder (Property Description with Points would be best suited) as the Default Legal Description report that consumes information from the Clearance tools.

### 8.9-2   Report Unit Format

During the first run of reports, one may find that the unit readouts do not appropriately reflect the number of significant figures required for the report. To adjust these settings, again on the InRoads Report Browser, navigate to the *Tools -> Format Options...* button from the menu.



Format Options

On the presented panel, one will find numerous settings to adjust the coordinate readout to whatever formatting is required.



Format Options

These settings will be saved between sessions, so one can adjust them initially and they will become the default for subsequent sessions. In the event that the installation be upgraded/reinstalled or new PC be received, these settings will have to be reconfigured.

# 9. MicroStation Plans Production

## 9.1 Resurface Plans

The following sections discuss MicroStation and Microsoft Excel resources to be used in the development of a set of resurface plans.

Resurface plans can be composed of one .dgn file with multiple sheet models, or several .dgn files each having a single sheet model. Regardless of the method that is used to create these plans, they should be produced using the 8.5" x 11" borders available in the Ltr_Sheets.dgn template file..

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\DGN\Ltr_sheets.dgn
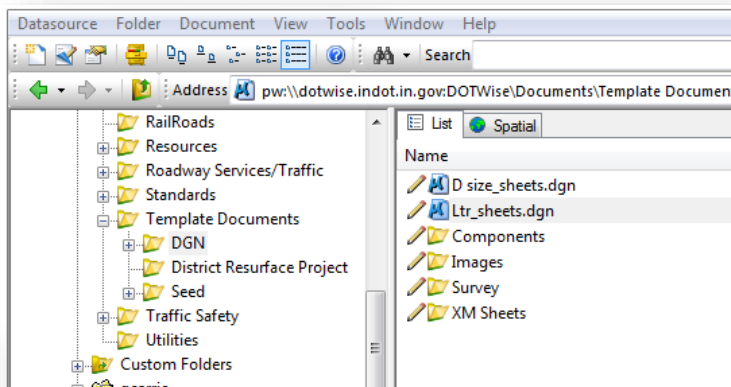


This file contains a set of 4 sheet models that can and should be used to develop each of the sheets in a set of Resurface Plans. Those sheet models are:

- *Ltr. Title Sheet.* This sheet model is the standard title sheet to be used with 8.5" x 11" plans.
- *Ltr. Detail.* This sheet model is a standard, empty 8.5" x 11" border sheet oriented in portrait.
- *Ltr. Landscape Detail.* This sheet model is a standard, empty 8.5" x 11" border sheet oriented in landscape.
- *Ltr. Detour Sheet Signing.* This sheet model is available to be used for the Recommended Detour Signing sheet.

These plan sheets should follow all drafting standards as specified the INDOT CAD Standards Manual, available for download from the INDOT CAD Support web page. See the Indiana Design Manual for information regarding the sheet content.

### 9.1-1 Ltr. Title Sheet

This sheet model should be used as the title sheet for all plans created using the 8.5" x 11" format. This and all other sheet models in Ltr_Sheets.dgn takes advantage of attribute exchange information which allows population of fields using the Universal Title sheet.

While in the open MicroStation file, import the sheet model titled Ltr. Title Sheet model from Ltr_Sheets.dgn.   When you open the newly imported sheet model, it will appear as shown in the illustration below.



### 9.1-1a        Placing the Location Map

Refer to Chapter 9 for instructions on placing a location map on this sheet.

### 9.1-1b        Placement of County Cells and Project Location Symbol

Placement of the county cell and project location symbol are accomplished by using INDOT Tools within the MicroStation tasks tool bar.

1. Select *INDOT Tools → Cell Libraries → County District Maps* from the Task bar in MicroStation.
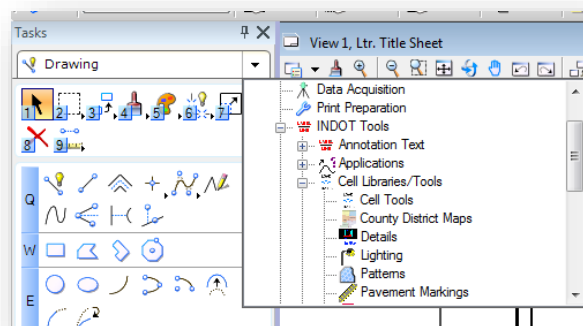


2. Within the Cell Library, navigate to and double left mouse click on the appropriate county or counties.
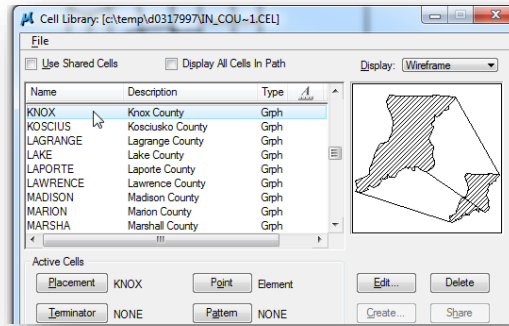
3. For 8.5" x 11" plans, you will need to set the X and Y scales to 0.50
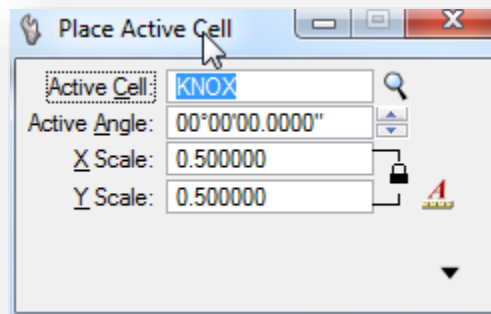


4. Place the active cell by using the lower left corner of the Project Location box as your hook point.
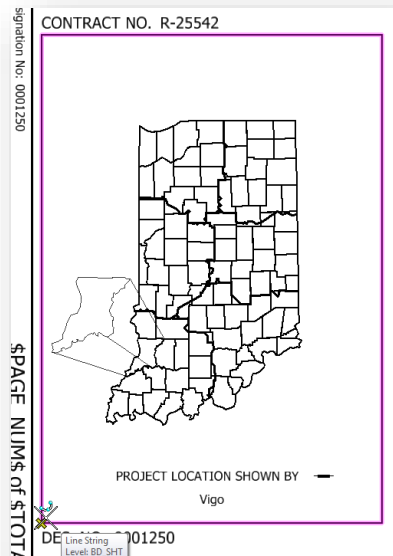
To place the location symbol, use MicroStation commands to copy the symbol from within the Project Location box to its correct positioning.

PROJECT LOCATION SHOWN BY

### 9.1-1c    Universal Title Sheet

The Universal Title Sheet is used to populate portions of the 8.5" x 11" Title sheet.  This information should only be edited using the Universal Title Sheet to insure that that information is populated throughout the entire set of plans.

The Universal Title Sheet is access within ProjectWise by selecting the Attributes Tab of the Properties dialog box of MicroStation design file (.dgn) and ensuring that the Interface is set to _PROJECT INFORMATION
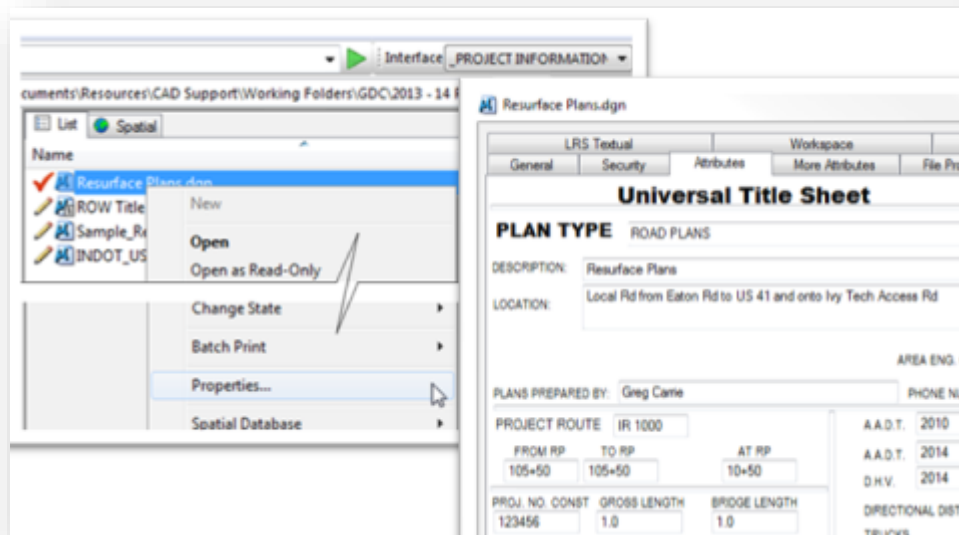
See Chapter 2 for more information regarding use of the Universal Title Sheet.

### 9.1-2   Ltr. Detail and Ltr. Landscape Detail

These sheet models are standard, empty 8.5" x 11" border sheets oriented in portrait and landscape.  This border sheet can be used for any drawing detail or table in a set of resurface plans.

While in the open MicroStation file import the sheet model titled Ltr. Detail Model from Ltr_Sheets.dgn.   When you open the newly imported sheet model, it will appear as shown below.  Text outside of the border is populated with the Universal Title Sheet.  The title of the sheet is edited by changing the description of the sheet model within the *Model Properties* dialog box.  Draw or reference details into the area within the border.
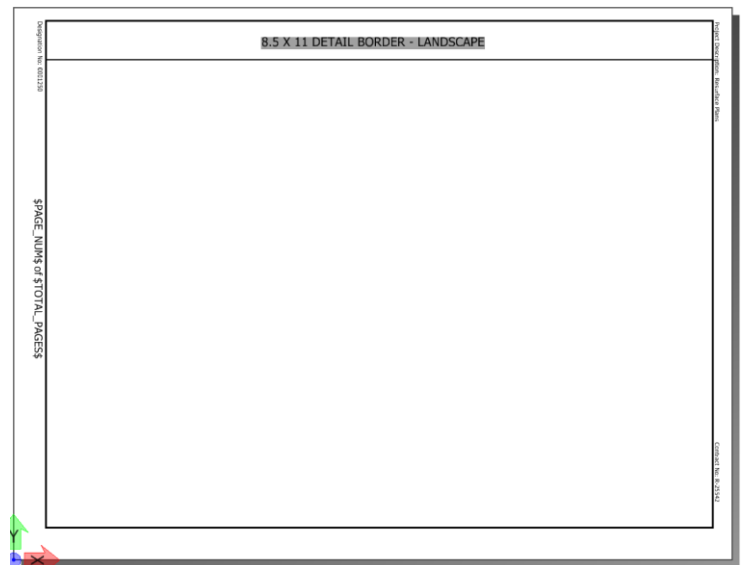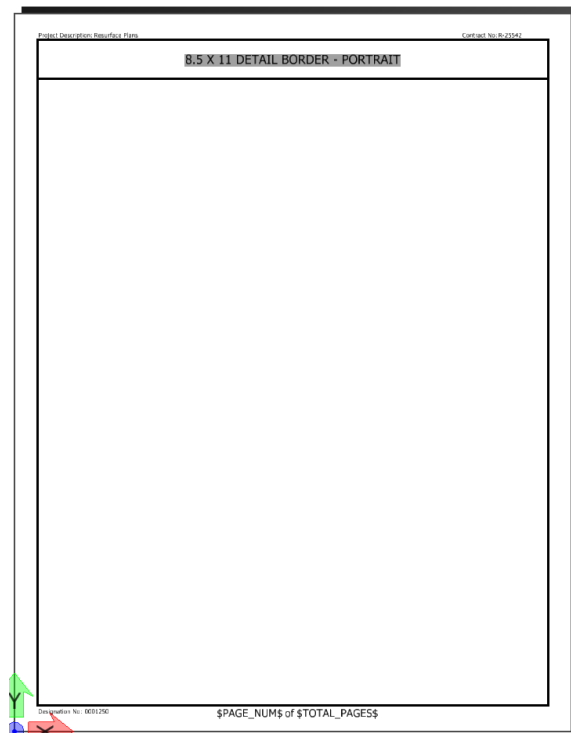
### *9.1-2a      Editing the Sheet Title.*

1. Within MicroStation (you do not need to be in the target sheet model) open the *Models Properties* dialog for the target sheet model.
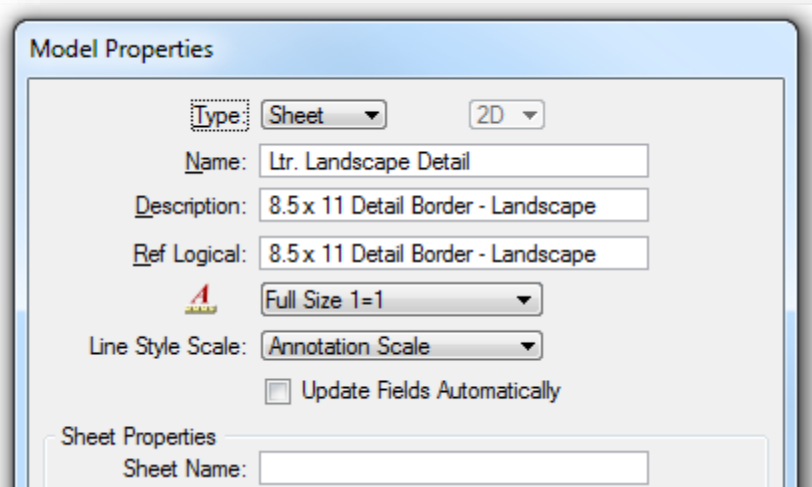


2. Edit the description of the sheet model to reflect the title of the drawing Detail
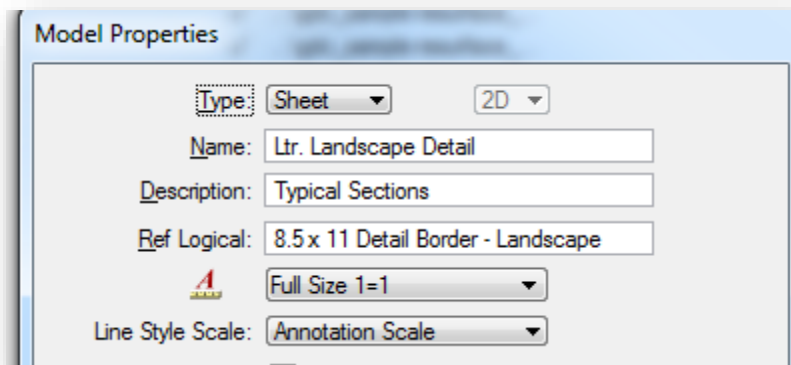


3. The title change will be reflected in your sheet model.
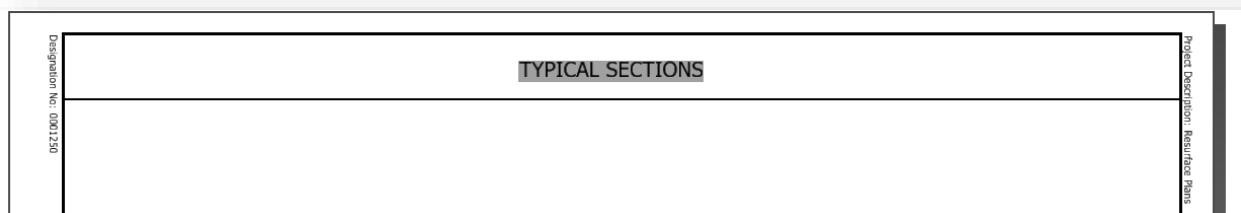
### 9.1-3 Ltr. Detour Sheet Signing

This sheet model was set up to be used for the Recommended Detour Signing sheet. This sheet model is pre-populated with a standard signing legend and uses the Universal Title Sheet to populate the route into the title of the sheet.

While in the open MicroStation file import the sheet model titled Ltr. Detour Sheet Signing Model from Ltr_Sheets.dgn. When you open the newly imported sheet model, it will appear as shown below.
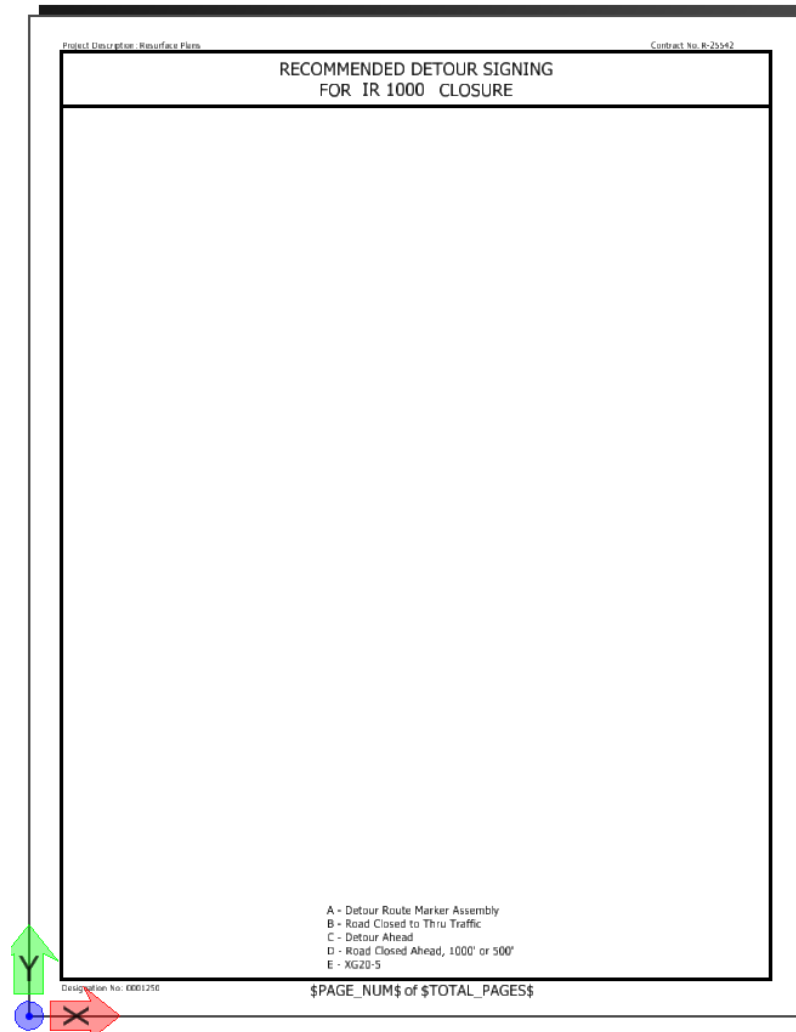
### 9.1-4 Miscellaneous Tables and Strip Maps

During the process of creating a set of plans on the 8.5" x 11" border sheets, you will need to add various summary tables and or strip map.

#### 9.1-4a Miscellaneous Tables

INDOT has provided a template Microsoft Excel file that contains several different tables that are commonly used (and some not so commonly used) on resurface plans. These excel tables have been formatted to be cut/pasted into the provided sheet models at a 1:1 scale.

The Microsoft Excel Tables are available in ProjectWise at…

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\Spreadsheets\Partial 3R Quantities.xls

Instructions for each table are included on each sheet within the Microsoft Excel file. Once completed, the tables can then be copied and pasted into a MicroStation sheet model.

*Copy and Paste Tables into Sheet Model.*

1. Complete the Excel spreadsheet and select the area that you wish to copy into a sheet model. Then either *Right Click → Copy* with your mouse or enter *Ctrl + C* on your keyboard to copy that information.

2. In the target sheet model, select *Edit* → *Paste*
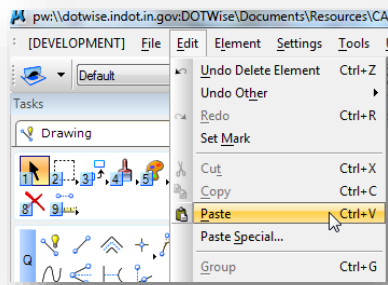


3. Select the area in which you want to paste the table in the sheet model using tentative snaps. This will paste a picture of the table in the sheet model. This image is not editable. To edit the table you will need to edit the spreadsheet file and then repeat the copy – paste operation.



Due to ProjectWise functionality, it's highly recommended that users not embed or link Excel sheets. There are two major issues that make these processes undesirable:

- Embedding – With an embedded spreadsheet, the CAD file must be open and then the Excel content opened from within the DGN. Additionally, one cannot link data across sheets with embedded Excel content.
- Linking – Due to the way ProjectWise functions with unique working directories for all users, linking will not work for any users other than the link creator.

### 9.1-4b   Strip Maps

Additionally, as part of a set of Resurface Plans, per the <u>Indiana Design manual</u> a Strip Map is required.  This should also be created using either the Ltr. Detail or Ltr. Landscape Detail sheet model(s).

Examples of a typical Strip Map are shown here.
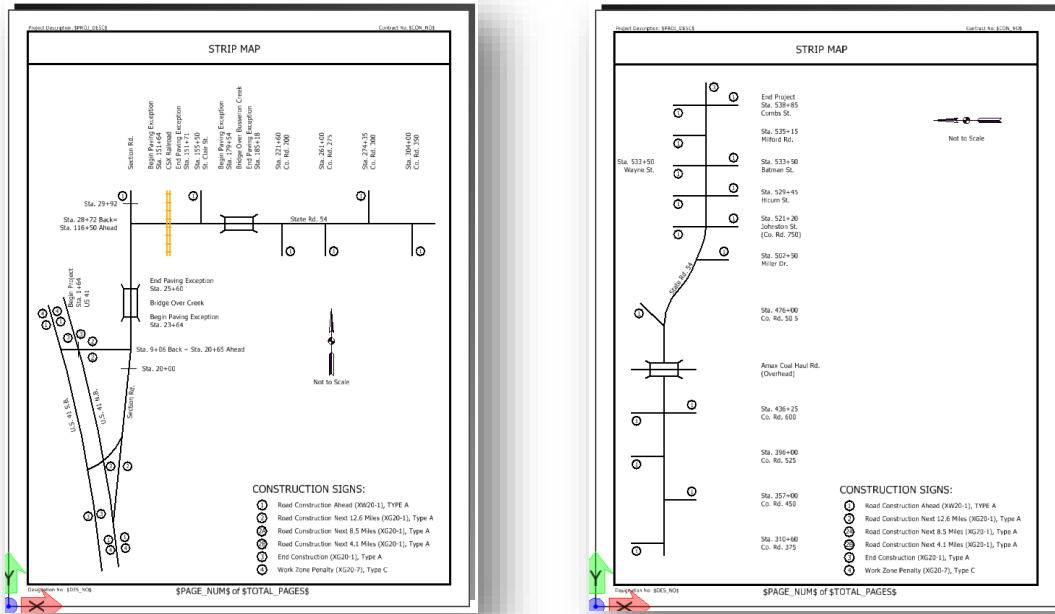


### 9.1-4a   Page Numbering and Electronic Signatures.

Please refer to Chapter 4 of this document to review usage of ProjectWise InterPlot Organizer to make use of automatic page numbering and electronic Signatures.

## 9.2　Traffic Plans Production

### 9.2-1　Signs Signals and Lighting Plans

The following sections discuss MicroStation resources to be used in the development of a set of Traffic plans for Signs Signals or Lighting.

Traffic plans can will normally start from one of two different DGN Seed Files.  These can be the US Survey Foot Seed File (INDOT_US_SVFT_seed.dgn) or the US Unit Seed File (INDOT_US_seed.dgn).  If the project is newer and has survey related data, a geocoordinated version of one of these files will be found in the Survey Project Files folder.
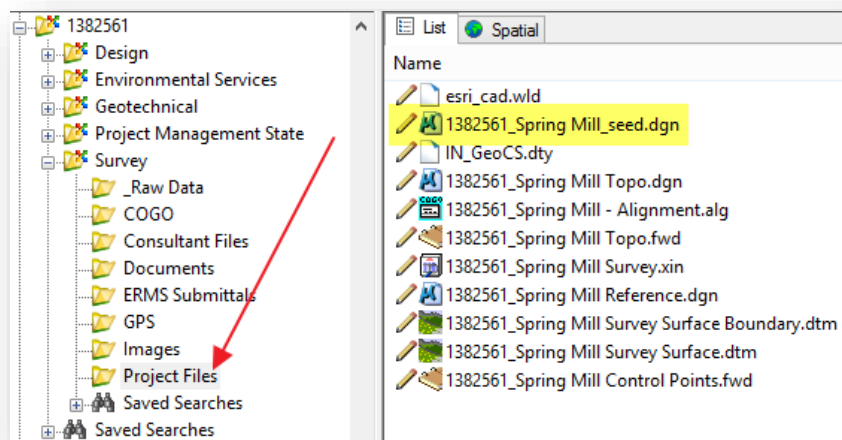


**Example Geocoordinated Seed Location**

The previous screen capture shows an illustration of where you might find the Geocoordinated Seed files if your project has been setup.  This should be the first location where seed files should be located.  If there is no survey data and the project has not been geocoordinated, the files will need selected from the Template Documents location shown below.  Regardless of which unit of measure you select or which file you are creating you should create the file using the Advanced Document Creation Wizard.

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\MicroStation\

### 9.2-2　Base Sheet Creation from Various Seed Files

In order to make sure all documents start off with the appropriate metadata, and to enable such features including automatic sheet population; all documents should be created using the Advanced Document Wizard.

For Traffic Plans, locate the *Des Number\Signs Signals and Lighting\MS folder*.  With this folder selected, the Document Pane will show the folder contents as they exist currently.  To create a new document, right click in the document pane and select *New -> Advanced Wizard*.
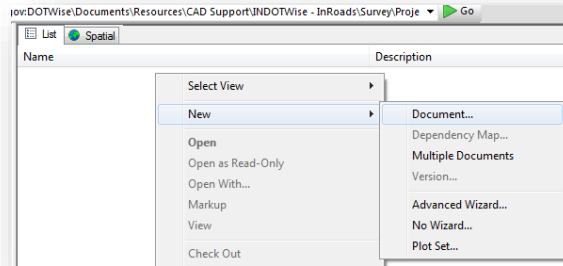
**Starting the New Document Advanced Wizard**

This will initiate the Advanced Document Creation Wizard dialog.
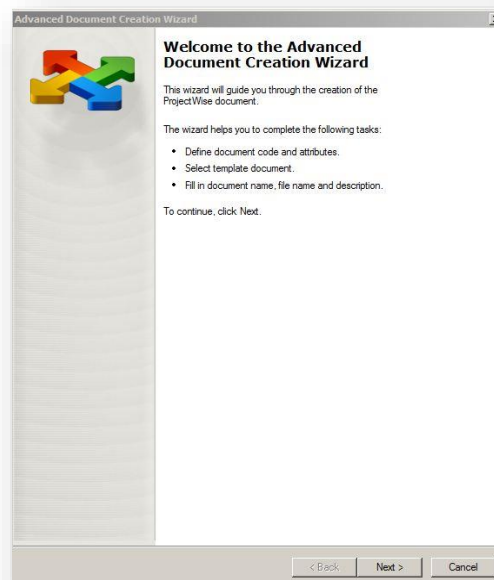


**Selecting the Advanced Wizard**

The first panel is informational and can be bypassed (*Next*).  The second panel confirms your location.  If for some reason you didn't have the correct folder active in your document panel, you can select it now or confirm the path shown.
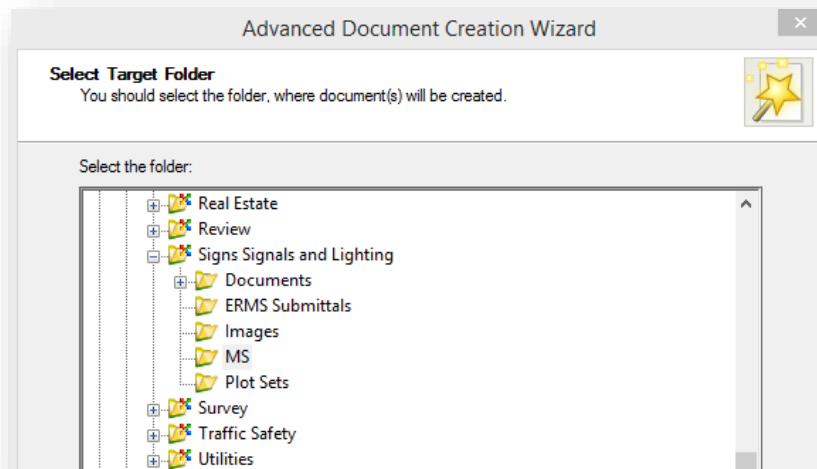
**Location Confirmation**

The next panel allows you to select the template document you'd like to use.  On the first line "*Use a ProjectWise document as a template*" option.  Press the select button.
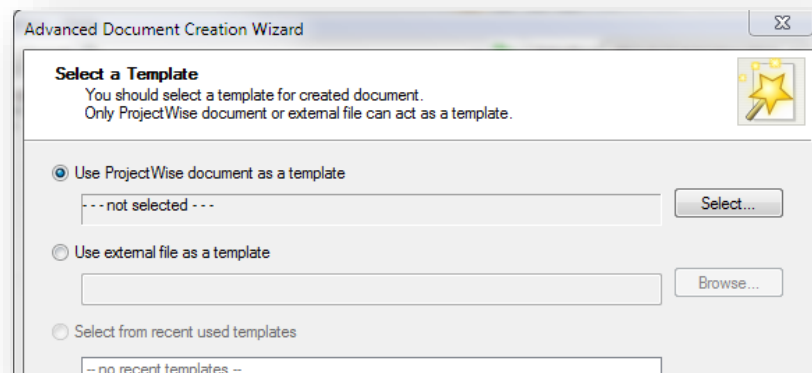


**Select a Template dialog**

In the "Select Template Document" panel, navigate to the MicroStation Seed files in the ProjectWise System and select the appropriate unit files for your project.  These files can be found at:

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\Seed\MicroStation\

Or if your project is provided with Survey Geocoordinated Seed files, look under the *Des Number\Survey\Project Files* folder as discussed earlier in this section.
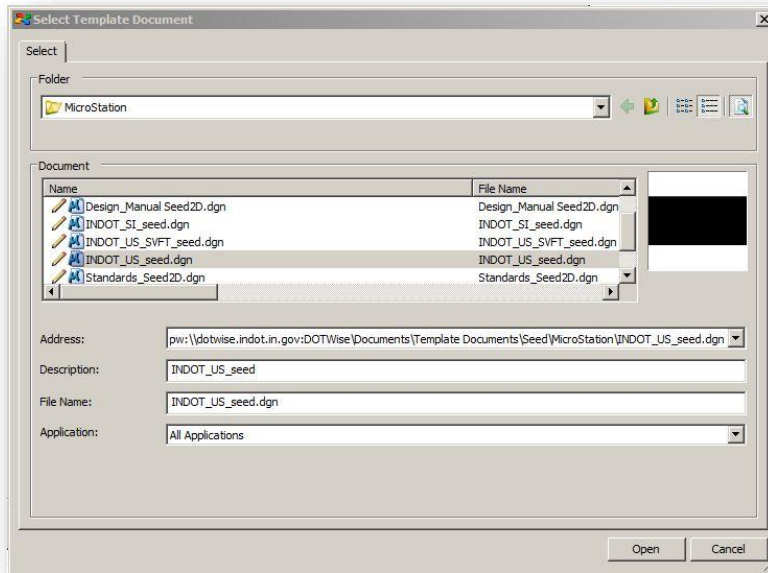
**Selecting a the Proper Seed File**

With your file selected, you can then proceed to the next screen. If you are prompted for Document Attributes, you may proceed beyond this screen as well, however it may be advantageous to populate the contents of this panel for any of the information you may already have. Below is a sample of the type of information that's configured for the auto sheet population for title sheets.



**Auto Sheet Population Panel**

The final step in creating the document is to provide a name. Traffic Signal Plans should be consistently titled with the following format: Des #_ Traffic Signal Plans.dgn. To ease document searches and for consistency purposes, all three names should be the same as shown.
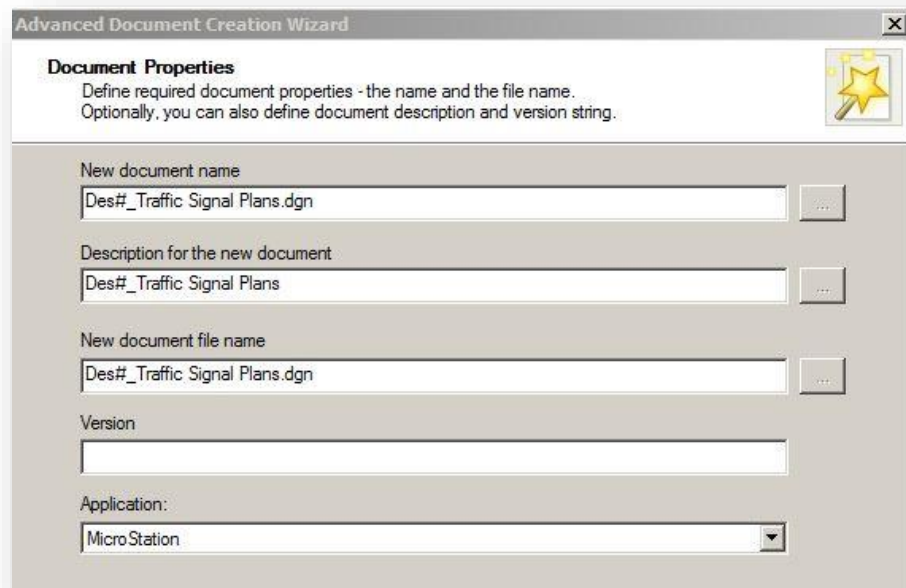


Document Properties and Naming

With the document named, you may now proceed through the remaining panels of the wizard and complete creating the document.

### 9.2-2a    Document Creation via Drag and Drop

In addition to the Advanced Wizard, you can also create files using drag and drop. To do so, you can open the Seed location in another window (right click, Open in New Window) and then drag the file from the seed location to your active project folder.
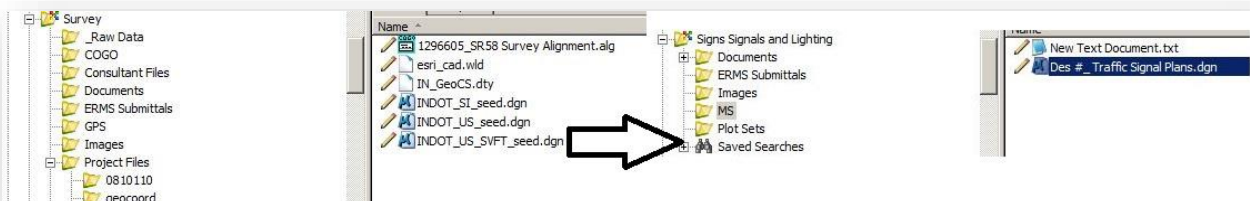


Drag and Drop File Creation

At this time you'll be prompted if you want to use either the Advanced or No Wizard options. If you select advanced, you'll be prompted through the steps from the previous section. No Wizard will bring the file into the location you've specified without an opportunity to adjust naming, etc.

### 9.2-3  Traffic Plans Creation

With a template document now created, the Traffic Plans can start being assembled.  The first portion of the Traffic Plan composition is the creation of the project title sheet.  This process can be found in XXX later in this chapter.  The first method of creation will be from pre-existing plan images.

#### 9.2-3a     Creating the Design from As-Built Plan Image

To start this process, first go back to the DGN that was created earlier in this section, Des#_Traffic Signal Plans.dgn.  Open the file from ProjectWise and switch to a new model.  For more details on creating/editing models, please refer to Appendix D of this document, or the MicroStation help file.

In a new model, start by opening the Raster Manager:
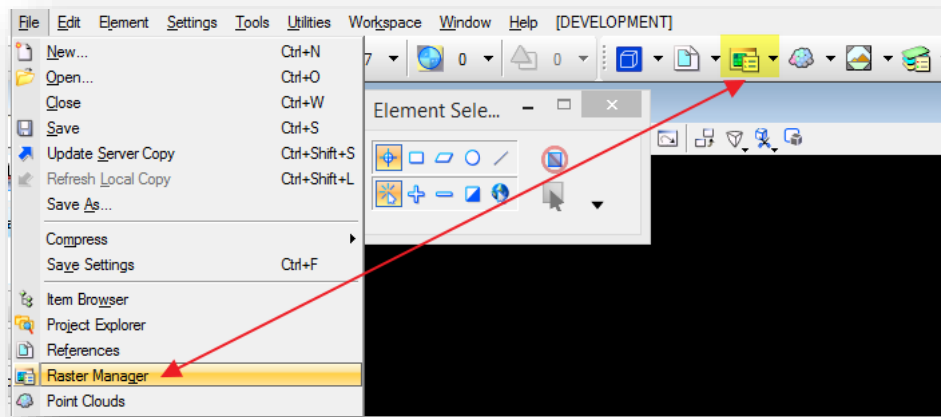


**Start Raster Manager**

After initiating the Raster Manager from one of the two locations shown above, the Raster Manager dialog will be displayed.  On this dialog, select the Attach Reference command from the File menu or toolbar as shown:
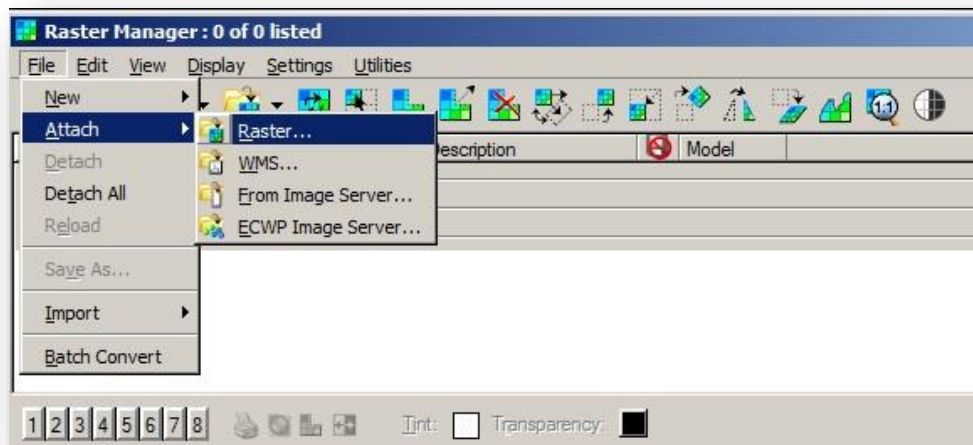


**Attaching a Raster**

Next, locate the scanned/PDF copy of the As Built Plans for the project.  As with most other project deliverables, these should be uploaded to ProjectWise for easy location, management, and security.
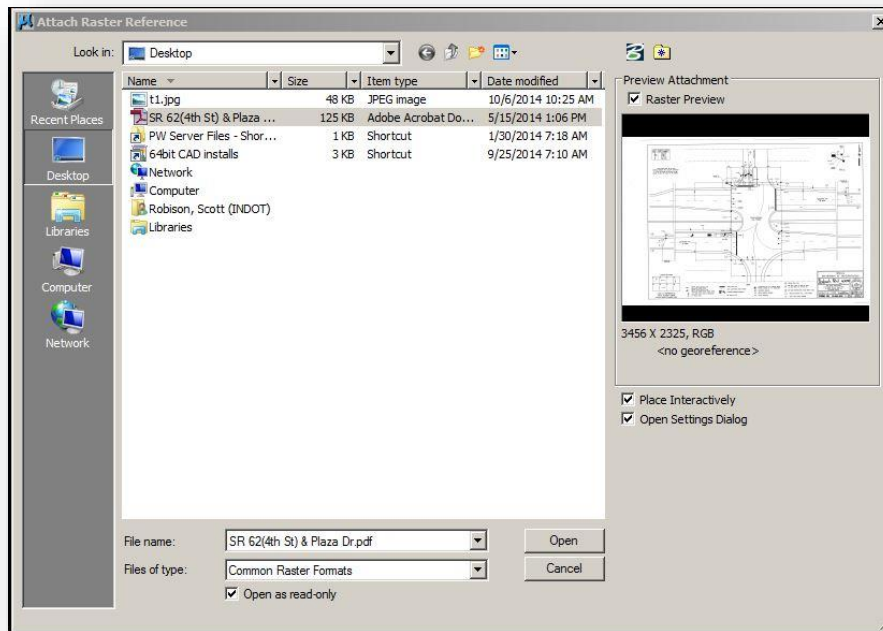


**Locating the As Built Reference**

During the attachment process, make sure that the Raster is attached at a 1:1 scale.  It's very important that the raster be attached this way in order to determine the necessary scale factor to rescale the raster by.

At this time, scaling of the As Built needs determined in order to draft the elements true scale.  In order to determine the scale, locate some of the dimensioned elements on the raster and measure them using the MicroStation measurement tools.
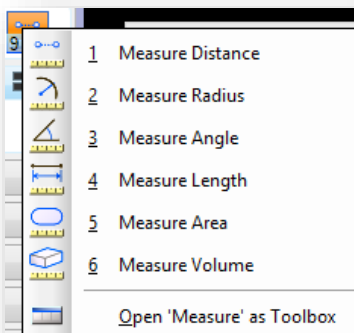


**MicroStation Measurement Tools**

To determine the scale factor needed to upscale the raster by, take the as dimensioned measurement from the drawing and divide it by the measured value using the MicroStation tools. For example the following illustration shows a dimensioned line that is listed at 19.5'. The MicroStation tools measured this to be displayed as 0.0752'. To calculate the scale factor, divide the dimensioned by the measured (19.5'/0.0752') resulting in a scale factor of 259.31.
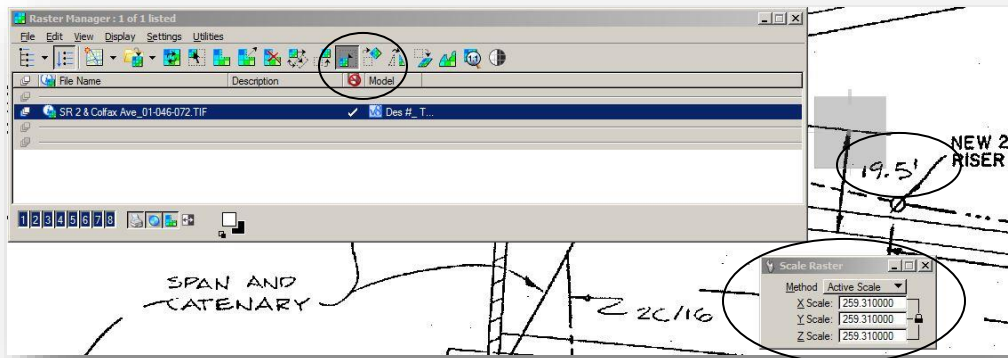


**Raster Scaling**

With the raster now scaled properly, one can now start drafting based on the As Built raster. Using the standard MicroStation drawing and Level tools, trace the geometry on the appropriate levels as provided in the DGNLib. These levels include the _TRAF_ prefix and can be filtered using the DGNLib filters as shown.
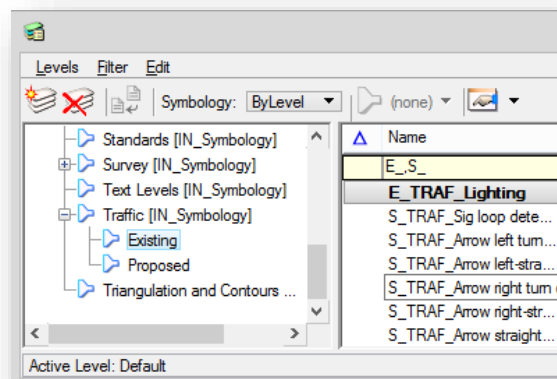


**Traffic Proposed and Existing Filters**
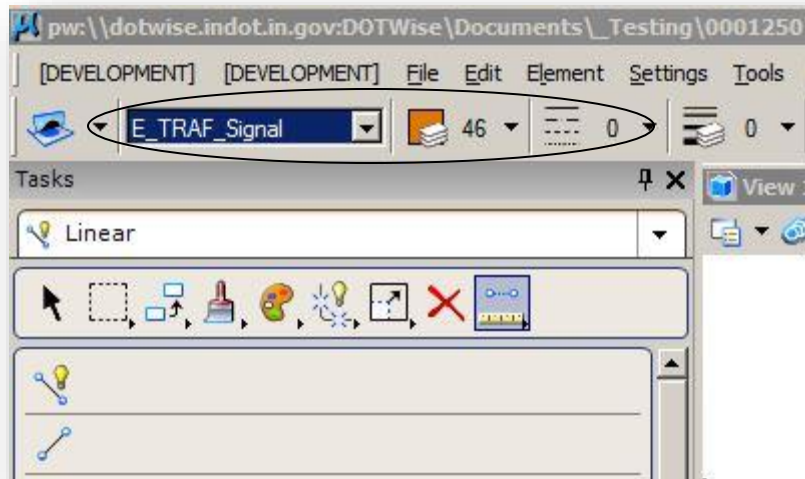
**Setting the Active Level, Color, and Linestyle**

Once completed tracing the As Built information, the Raster Image can be detatched.  Do so by opening the Raster Manager, and highlighting the As Built, and either Right Click -> Detach, or from the File -> Detach menu option shown below.


**Detaching a Raster**

At this point, the Traffic Plans should be completed using standard MicroStation tools.  Later in this chapter, a review of sheet creation will occur.  First however, brief explanations of alternate plan creation methods will be discussed.

### *9.2-3b     Creating Traffic Plans Without As Builts*

In many projects, it's quite common to start a project without any As Built data.  In this instance, alternate sources of data can be used in order to have a raster image background from which the geometry can be traced.

As with the previous section, start by creating a new model.  Once prepared, start the Raster Manager as discussed in the previous section.

In this instance, an As Built will not be available.  In lieu of this, the INDOT GIS department has made available a listing of WMS Web Map Services.  These map services are discussed further in Chapter 10, however a brief overview of the attachment process is provided here.

The first step is to select the *File -> Attach -> WMS*:
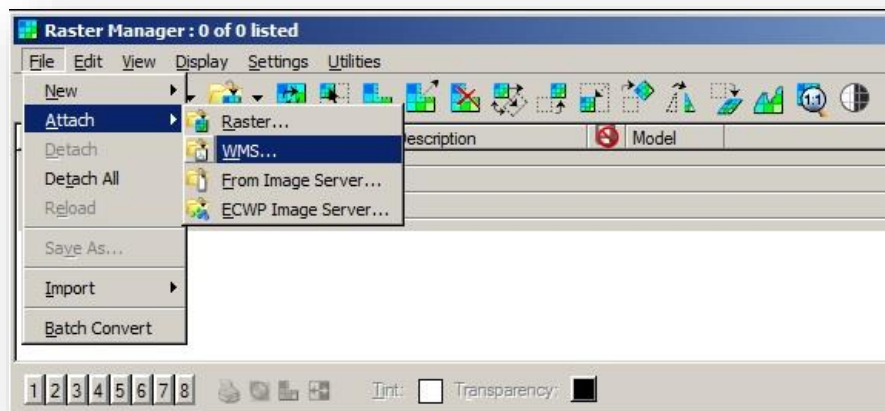


**Attaching a WMS Map**

On the presented Attach Raster Reference File dialog, navigate to the XWMS folder in ProjectWise. This folder is located at:

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Resources\XWMS\

Select the *CADStreetAnno.xwms*, and the *2011_2013 Statewide Imagery.xwms* and select OK. Please note that the GIS staff is constantly acquiring and processing new imagery, so newer versions of these maps may be available, especially the Full Res images.  Check often if new images have been made available.

*Note:  When using the rasters, the following issues may be encountered:*

1. *The 2011_2013 Statewide Imagery.xwms may have performance issues during usage.  This is a known issue and cannot be resolved by CAD or GIS Support staffs.*
2. *The Orthos Full Res 2005.xmws perform very well, but are out of date.*
3. *Each set of rasters has benefits and disadvantages, use the Orthos that fit your project needs for the best experience.*
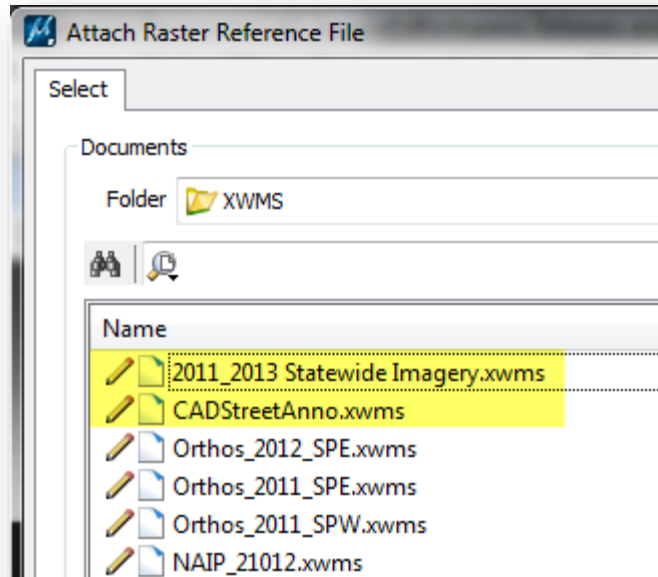
**WMS Raster Attachment**

With the images now attached, MicroStation will start streaming the images based on where your view is located. It's highly recommended to zoom all the way out so the entire state map is visible, and then Zoom down to the intersection.

With the location of the intersection found, go back to the Raster Manager. Highlight the CADStreetAnno.xwms, and then select *Display -> Bring to Front* from the Raster Manager toolbar.
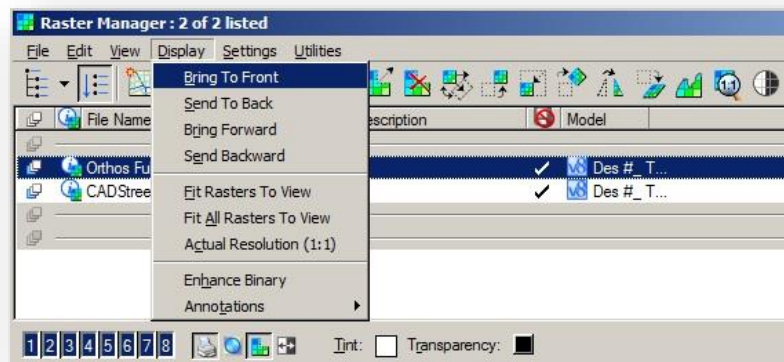


**Bringing the CADStreetAnno.xms to the Front**

At this time, the extraneous raster imagery needs cropped out. Select the clip tool from the Raster Manager toolbar and then crop just the rasters to just the needed area.
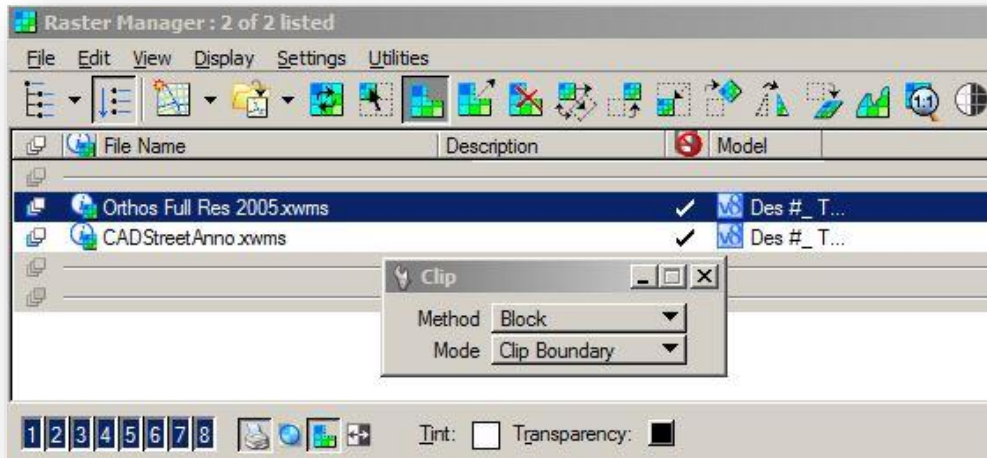
**Raster Clipping**
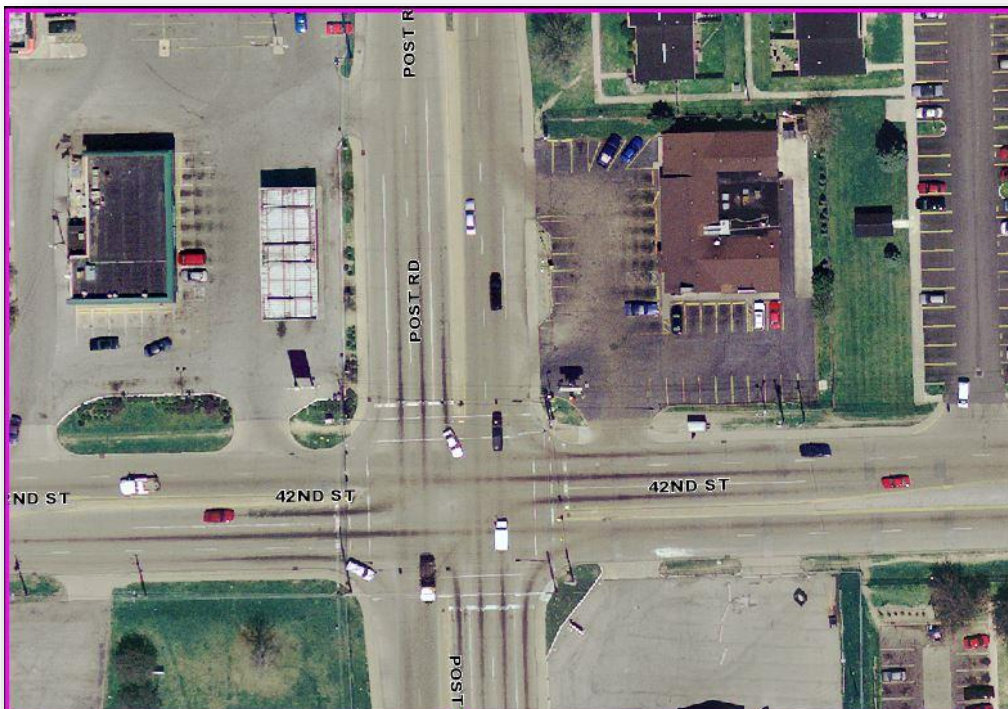


**Clipped Rasters**

Next, the rasters need to have their geolocation enabled so they display in the correct spot on the DGN.  To do so, set the Option to Not Inherited under Geometry (as shown below), so that image falls into place.
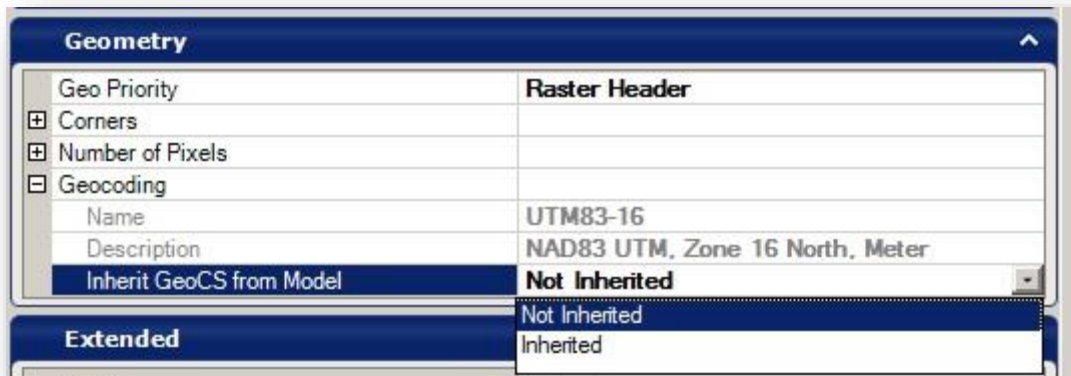
Setting the GeoCS to Not Inheirited

At this point, the plan development process is the same as in the previous example. Trace the geometry using the appropriate symbology, and detach the rasters when completed.

### 9.2-3c    *Traffic Plans when Survey or Design Data is Available*

In this instance, the traffic plans process will start from pre-existing data directly in a MicroStation format. As was discussed earlier in this chapter, the first place to look for a seed file in this instance will be under the *Survey\Project Files* folder for the project.

At this time, the Survey Geometry can be used direction from the TOPO drawings. Note that there are a variety of methods to get and use this data:

- The data can be referenced and traced.
- The data can be referenced, and merged.
- The data can be referenced and copied directly.

Depending on the method chosen, the data must be modified to the appropriate symbology for Traffic Plans and the development process can occur.

The above process are also valid when working on Traffic Plans that are part of a broader Design project. In this instance, instead of using the TOPO, the pavement markings will be used in the same fashion listed above.

At this point for all 3 methods, it's time to take the created Traffic Plan and place it appropriately in a MicroStation border.

### 9.2-3d    *Creating the Detail Sheet*

The final steps for completing the Traffic Plans is the creation of the Detail Sheet for the project. Working out of the Signals Plan drawing, import a separate Arch D size sheet model using Models tool with appropriate sheet border. These borders can be found in the D_size_sheets.dgn located in ProjectWise at:

pw:\\dotwise.indot.in.gov:DOTWise\Documents\Template Documents\DGN\D size_sheets.dgn
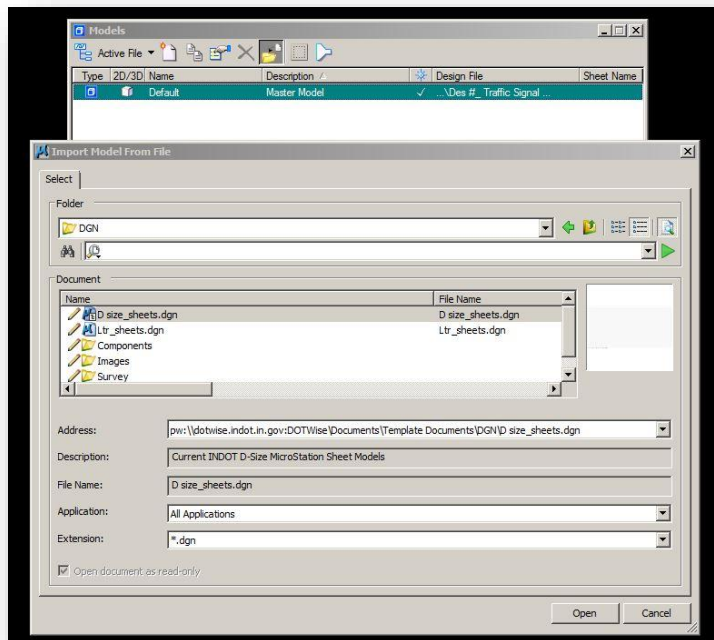
**Locating the D_size_sheets.dgn**

With the border file located and opened, select the appropriate border from the list to Import into the Open dgn. For example, the SG_Detail Sheet.
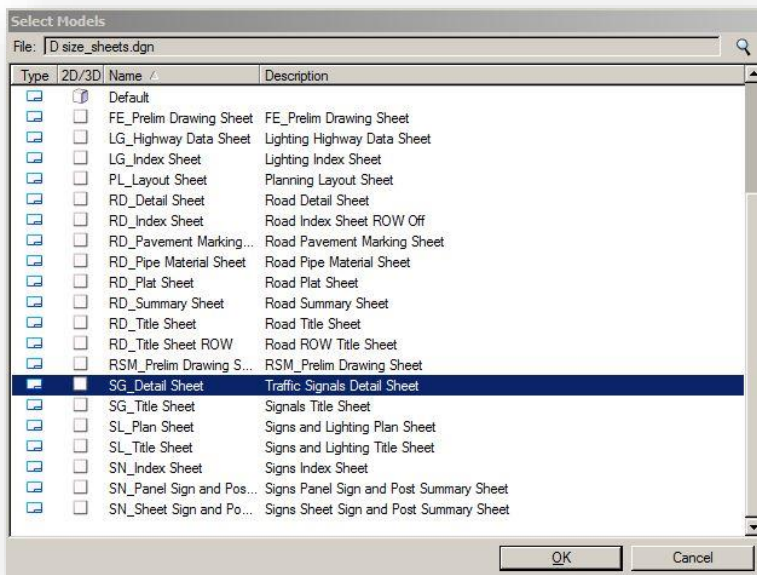


**Selecting the Detail Model**

This will bring a copy of the model into the active drawing. Select this newly imported model and open the Reference Attachment dialog:
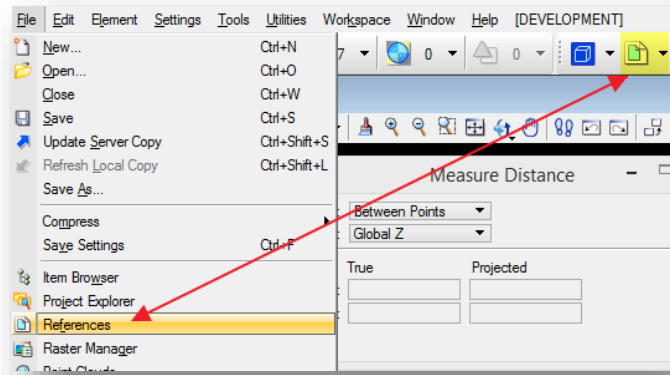
**Attaching a Reference**

Next, reference in the model containing the Intersection design as required to the appropriate scale (1"-20' or 1"-30' As per IDM).  Note that an alternative method would be to drag and drop the model from the Models dialog to the References dialog.
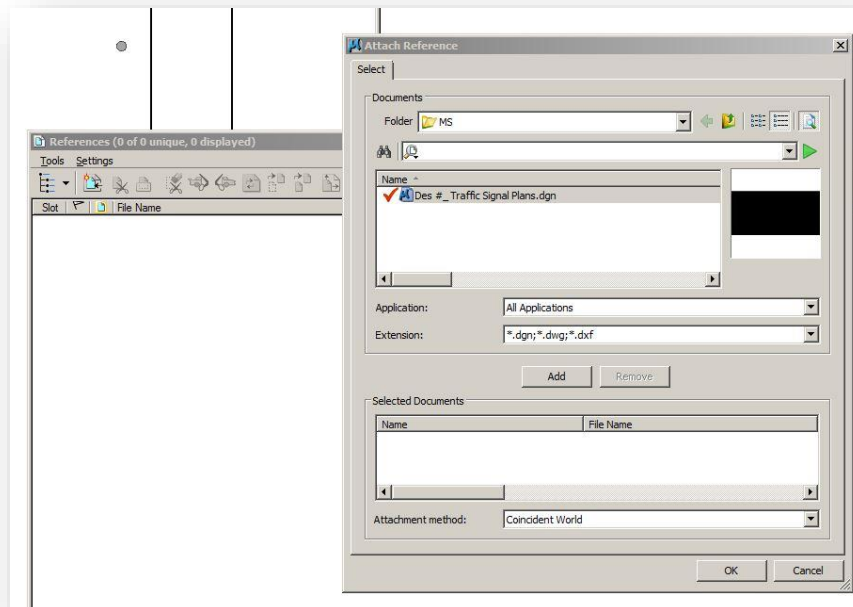


**Intersection Attachment**

This concludes the Traffic Plans development process.  At this time, the final file is prepared for plotting using the tools discussed in Chapter 4 of this document.

# 10.  ArcGIS and CAD, Geocoordination and Data Sharing

## 10.1  ProjectWise Connector for ArcGIS

The Connector is a ProjectWise Explorer Extension to the ArcGIS Connector, which provides the ability to exchange geospatial content between the ArcSDE database and DGN documents within ProjectWise.  Once features are extracted into the DGN file it can be used as references in design sessions.  Currently the ArcGIS connector will not work with shape files or personal geodatabases.

The supported Geodatabase feature classes supported by the Connector are point, line, polygon, and annotation feature classes (standalone and feature-linked).

When one or more extractions are performed, these requests are sent to ArcGIS Connector for processing. The Connector begins by checking out the DGN document from ProjectWise so that no other user can lock or alter the document while the request is being processed.

The ArcGIS connector assigns symbology to point, annotation, line, and polygon features during the extraction, based on the definition contained in the Geospatial Connector Administrator, thus allowing a fully symbolized DGN.

Coordinate systems are understood between the two separate systems and can be extracted and re-projected to the desired coordinate system of the DGN file.

### 10.1-1  Bentley Map

As mentioned throughout this document, Bentley Map is now offered within InRoads, and is a full-featured GIS (not to replace ArcGIS) which can import and export ESRI file formats. Additionally, Bentley Map can natively reference the ESRI file format .SHP without conversion. Therefore the data is referenced directly with no setup required, and can provide an intelligent backdrop for working in MicroStation, as well as allowing the review of ESRI attributes.

With Bentley Map being tightly integrated with MicroStation, it will allow the simultaneous manipulation of raster and vector data with CAD accuracy.

Bentley Map is capable of transforming various coordinate systems "on-the-fly".

### 10.1-2  Connecting to a GIS database

1. Login to ProjectWise and navigate to project folder that will contain the DGN file.
2. Right click on folder and select *Spatial Database -> New Spatial Database Connection.*
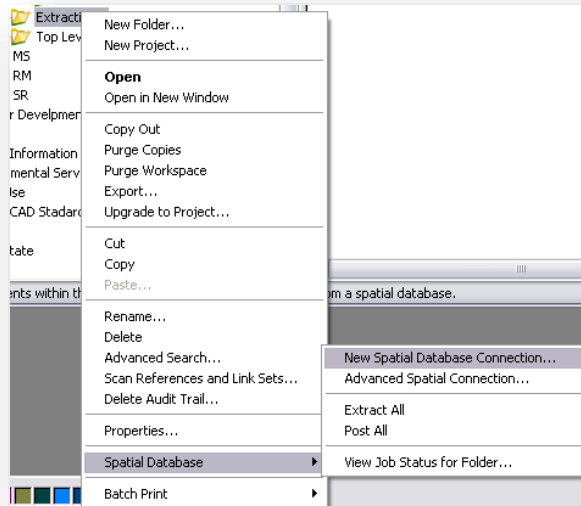
3.  The Welcome to the New Spatial Database Connection Wizard appears.  The connection accounts are Read Only, therefore select Extract from the Spatial Database for view only and *Single Document for Output -> Next.*
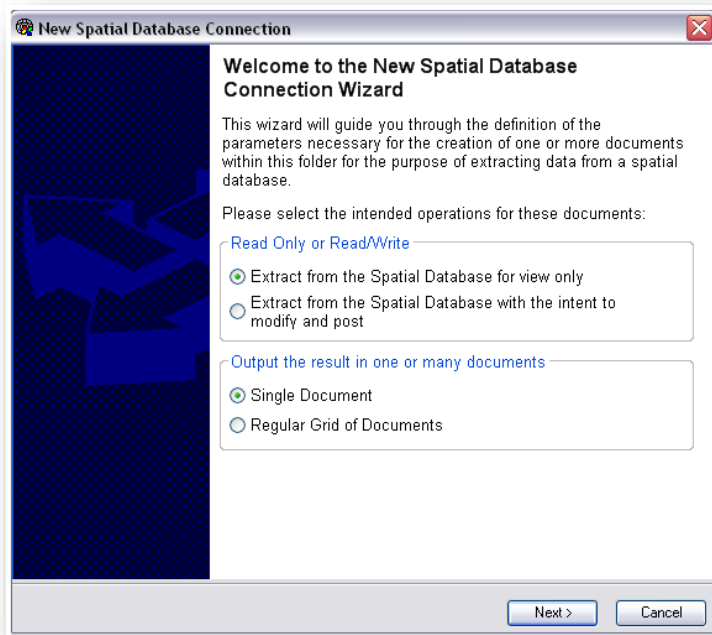


4.  The Select the Spatial Database and the Workspace window appears.
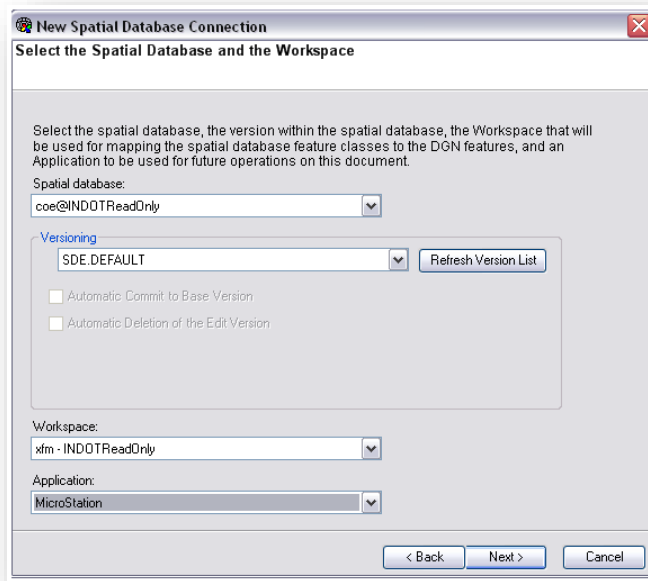
*On the Spatial database dropdown select the desired database:*

*gisread@DOTReadOnly – INDOT's GIS managed database*

*coe@INDOTReadOnly – Center of Excellence managed database*

On the Application dropdown choose either MicroStation or Bentley Map.  It is recommended to select MicroStation -> Next.

5.  The available features of the chosen database will be listed in the *Select the Feature Classes to be Extracted* window.  Place a checkmark next to desired features to be extracted then select Next.
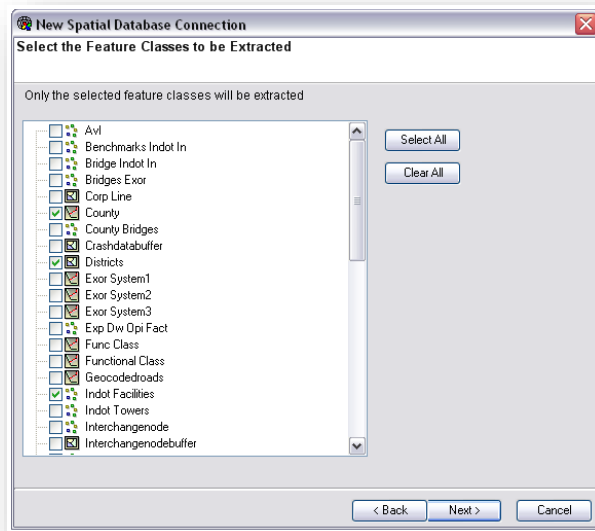
6. The *Select the Area to be used for the Extract Operation* window appears:
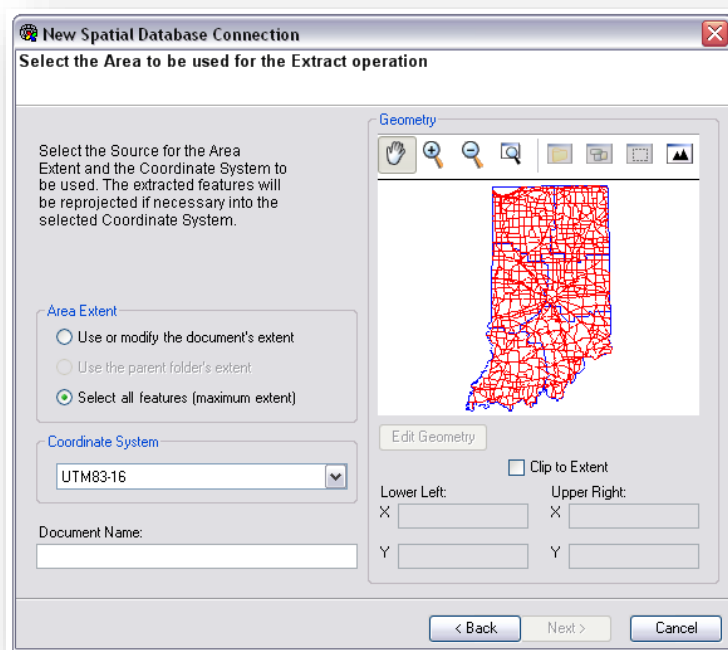


There are 3 options for *Area Extent*; INDOT is currently utilizing the first and the third option.

*Use or modify the document's extent - Defines the document spatial extent directly*

Select all Features (maximum extent) – Retrieves all data regardless of spatial extent. The document's extent is defined by the data retrieved from the database.

If you choose to use or modify the document's extent, the Edit Geometry button becomes active. Open the dialog box for digitizing geometry over a background map.

The geometry provided is not restricted to a rectangle and can be any shape. The display will calculate and display the lower left and upper right corners of a bounding box, but the actual geometry will display over the background map. When using the document's extent, key-in values in the lower left and upper right fields.  These values will generate a rectangle for the document extents.

*Coordinate System* – To be used for the resulting document.

*Document Name* - Be sure to name the file with a .dgn extension (so that ProjectWise recognizes the file type).

7.  In the *Completing the New Document(s) for Extraction from Spatial Database* Wizard window select *Extract All Documents* if you wish to run the extraction immediately.  Select *None* to run the extraction at a later date as explained later in this document, but for this example *Extract All Documents* will be selected.  At this time select *Finish.*
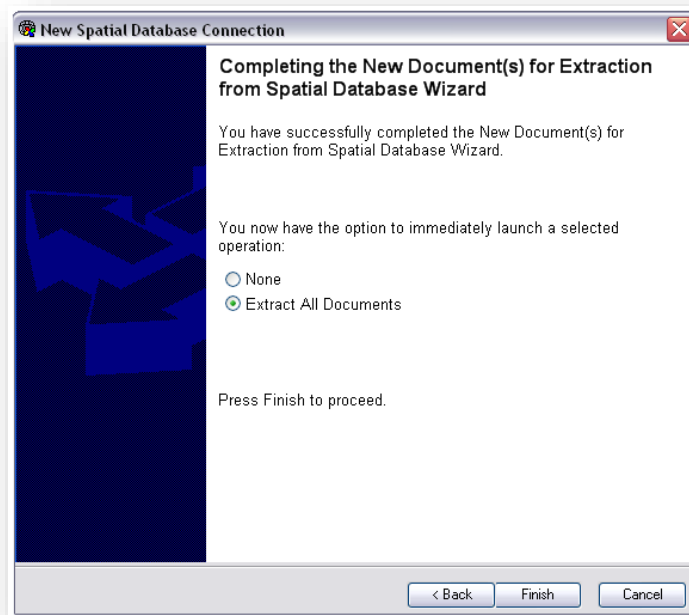


8.  In your ProjectWise session the document will appear with a padlock next to it, indicating it is extracting the data.  Once completed the padlock will deactivate and the file is ready to open.
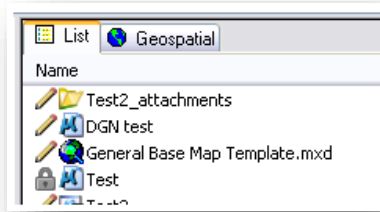
### 10.1-3  View Job Status for Folder

This can be utilized if the padlock is visible, there are issues with the created document, or you would like to monitor the extraction status.  This is located under the *Spatial Database* menu.
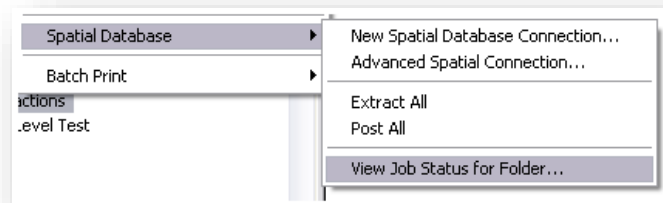


The window's appearance is as follows:
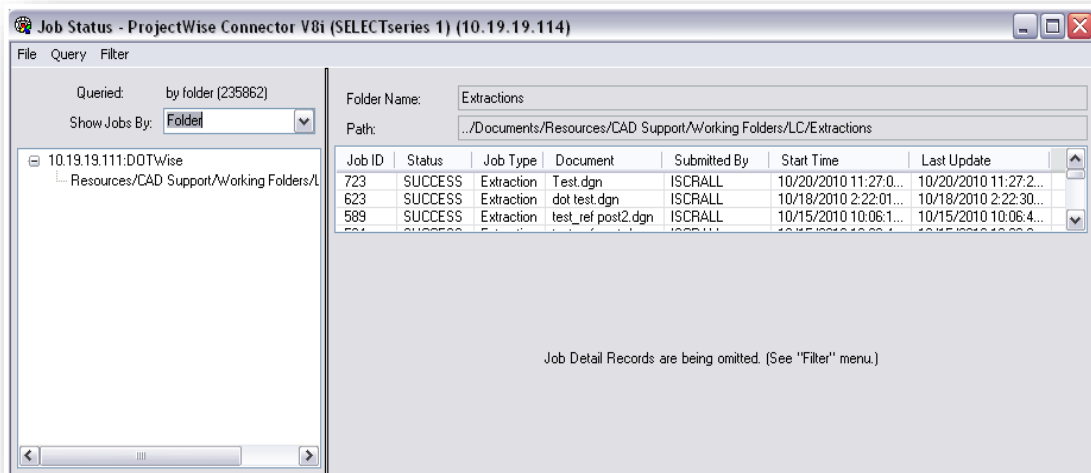


The Status will indicate PENDING as the extraction is in progress and will change to *SUCCESS* when completed.  Under the Filter dropdown is the option for detailed messages that can be selected if there is an issue with the extraction and needs to be reviewed.
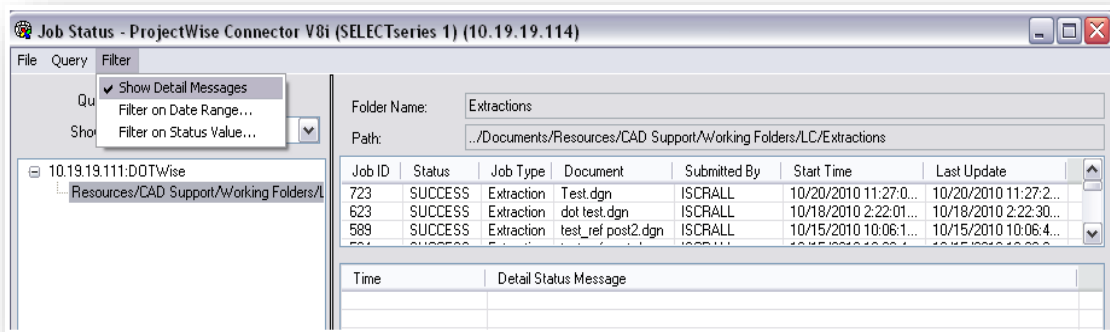
### 10.1-4  Updating/Requesting an Extraction

You may need to update or request an extraction for one of the three following conditions:

- You selected *None* at Step 7 in  the section 10.1-2 Connecting to a GIS database
- The database content has changed
- At regular intervals

You can request a new extraction by right-clicking on a folder and *selecting Spatial Database -> Extract All*:
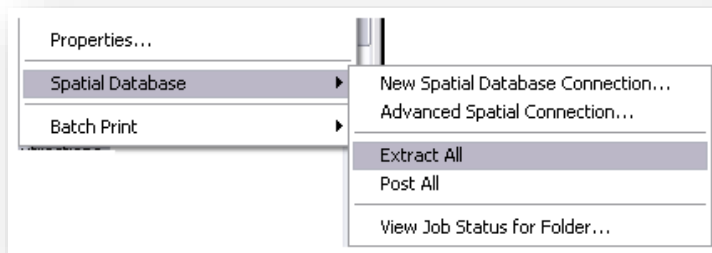


Or right-clicking on a document and selecting *Spatial Database -> Extract from Spatial Database:*
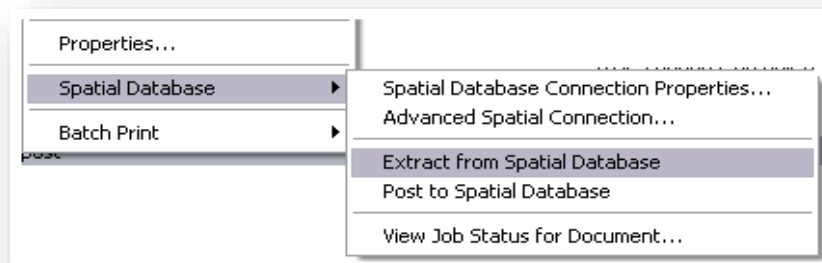


After the DGN file has been created, it can be opened with either MicroStation or InRoads Suite and the activation of Bentley Map within InRoads.  Bentley Map is the primary software used due to its

geospatial capabilities.  As INDOT is not licensed for standalone Bentley Map installations, Map must be started from within InRoads.  If InRoads is not available then MicroStation can be utilized but without the GIS attributes that were associated with the elements.

### 10.1-5  Opening the Managed DGN in Bentley Map and Reviewing Element Attributes

1. Open the DGN using MicroStation by activating InRoads from the *Application* pull down menu.
2. Once InRoads is open, activate Map by going to the *Application* pull-down menu and selecting *Map -> Activate Map.*
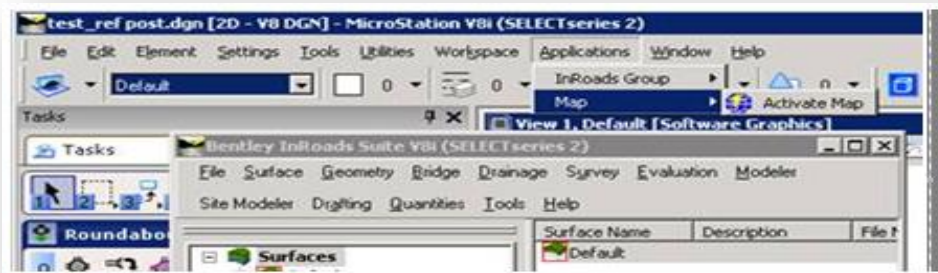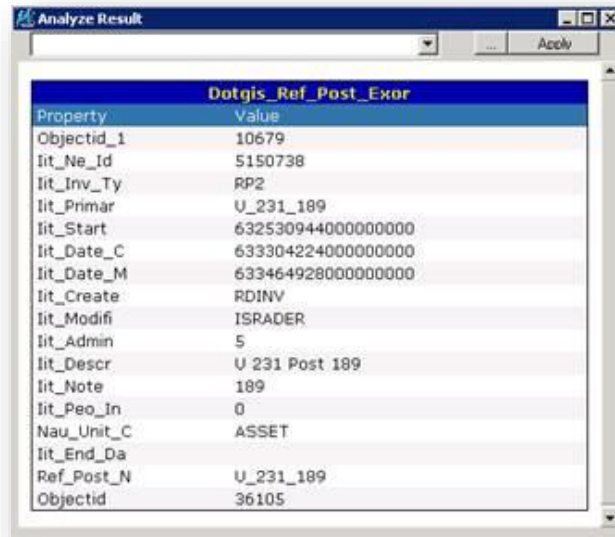


3. After Map has opened go to the Tools dropdown menu and select Geospatial → Utilities.
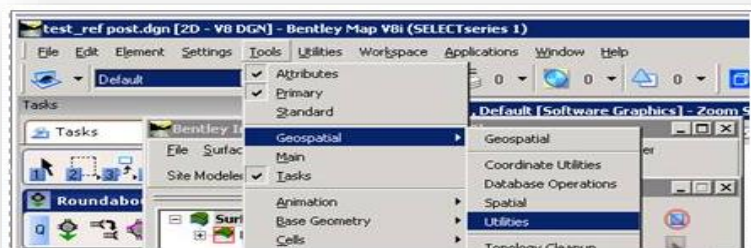


4. On the Utilities toolbar select Analyze XFM Feature.
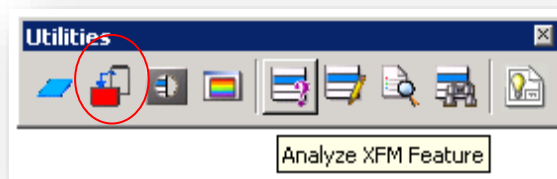


5. Select an element.  The attribute information will come up in the Analyze Result window.

## 10.2     WMS and Aerial Imagery

### 10.2-1  Introduction to WMS

A Web Map Service (WMS) is a standard protocol which provides georeferenced map images over the Internet that have been created by a map server using data from a GIS database.  At INDOT the map data is obtained from the ArcGIS Server.  MicroStation or Bentley Map via InRoads can then be used to connect to the WMS.  The INDOT WMS server connections have already been established and preset WMS map definitions (XWMS files) have been created for the available images.  Currently the available map definitions are NAIP 2008 Full, NAIP 2010, Ortho 2005, and Orthos Full Res 2005, Quad 24k (NAIP 2011 not completed).  These preset map definitions are located in ProjectWise at the following location:  Documents\Resources\XWMS.

### 10.2-2  Open existing Map Definition

1.  Open a MicroStation or Bentley Map session within ProjectWise.  Under the *File* dropdown menu open *Raster Manager*, as shown below:
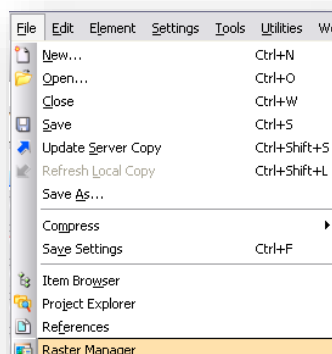
2. On the **Raster Manager** window select **File -> Attach -> WMS.**
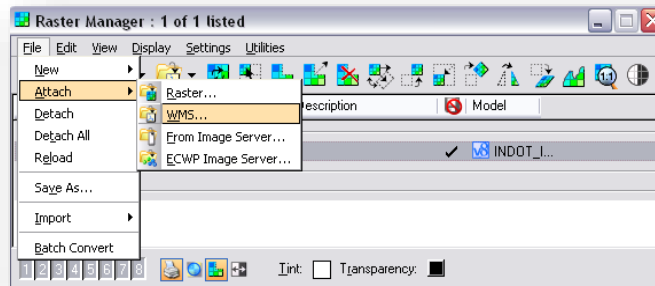


3. ProjectWise's **Attach Raster Reference File** window appears.  In ProjectWise navigate to pw:\\dotwise.indot.in.gov:DOTWise\Documents\Resources\XWMS\.  Within this folder, select the XWMS resource file you need to attach.
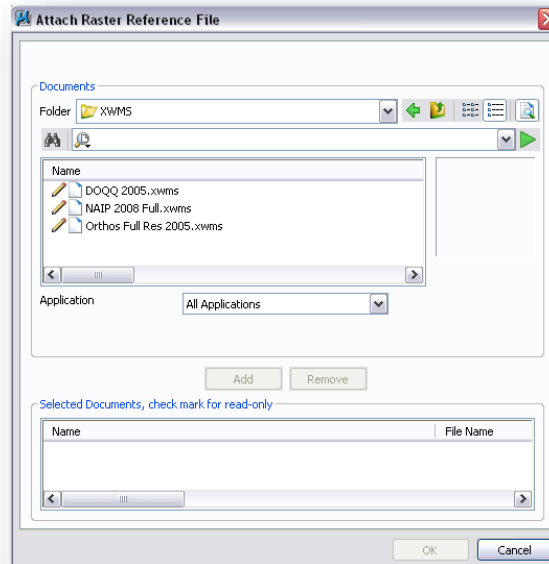


*NOTE:  If the high resolution Orthos Full Res 2005 is selected, there is a scale dependency associated with the image.  Meaning the image is only visible between certain zoom-scales.*

4. Once the XWMS file has been selected, select **Add -> OK.**
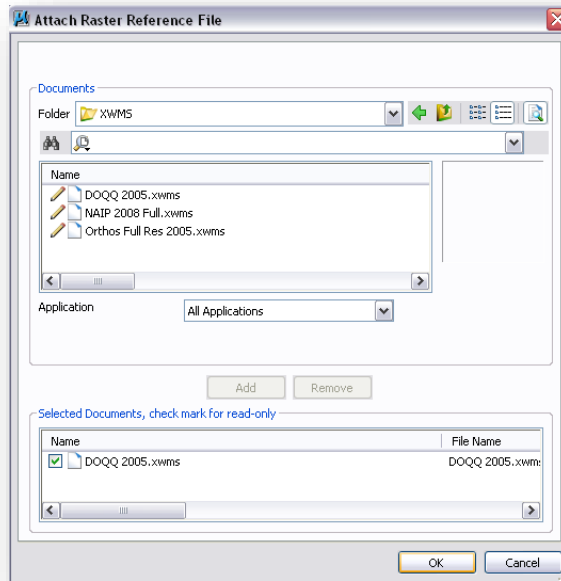
5.  In the *Raster Attachment Options* window make adjustments to options as desired, and then select *Attach* at the bottom of the window.
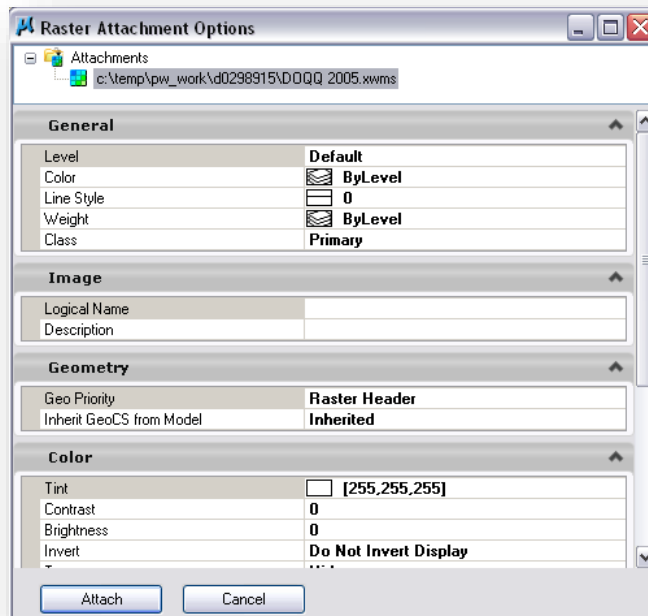


6.  The image is now attached to the DGN as shown in the *Raster Manager* window.
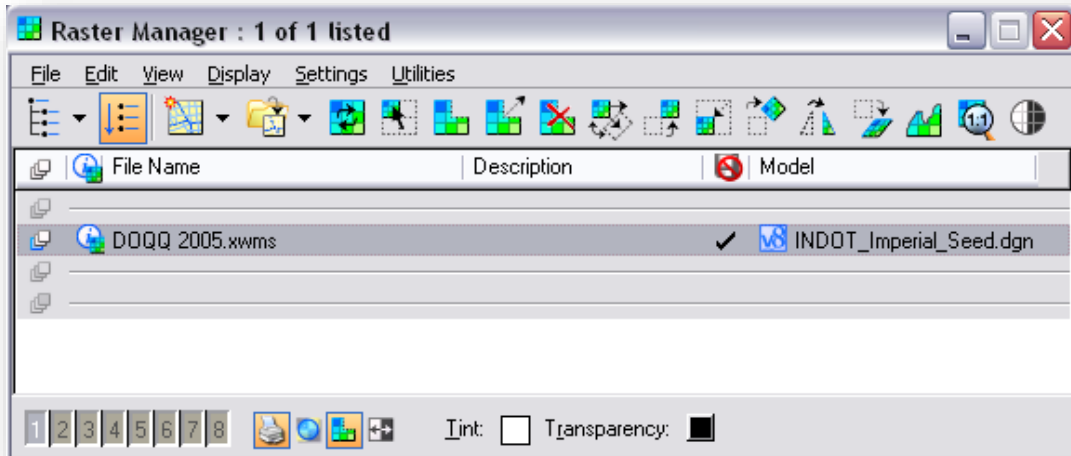
## 10.3    Map Insert Application

1. A link to the Map Insert Page creator application can be found under the Important Links list on the INDOT CAD Support SharePoint site at the following location: http://sharepoint.indot.in.gov/cadsite/default.aspx

2. Click on the Map Insert Page link or copy the following URL to your browser navigation (http://intranet.indot.state.in.us/CadGisWeb/gisapps/MapInsertFlex).  A new internet explorer window will open displaying the Map Insert Tool.
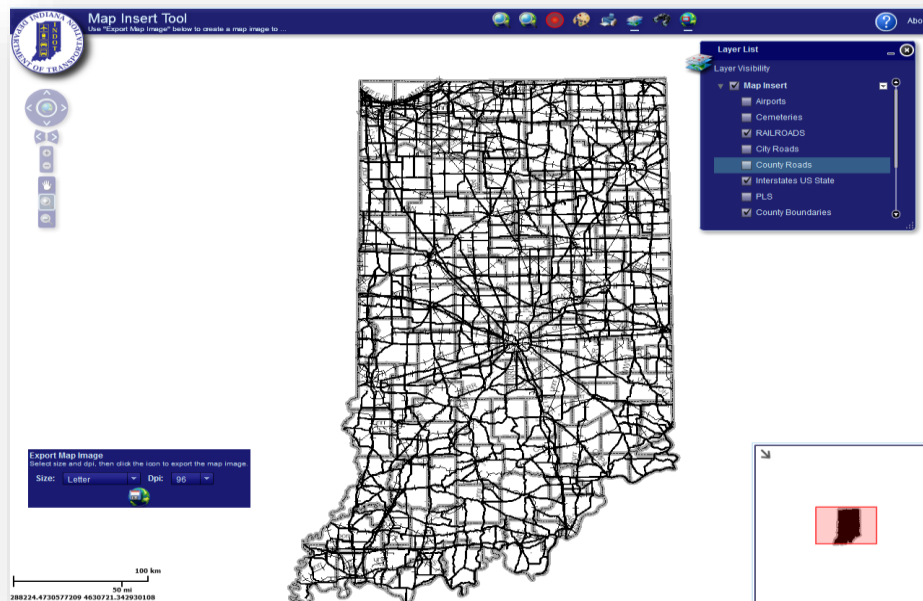
3. At startup the entire State of Indiana is displayed along with a location/overview map in the lower right corner. To zoom in to a specific area of the state you can use the mouse wheel. By clicking the left mouse button and holding it down you can pan the view.
4. If you would like to zoom to a specific Indiana county you can use the County (Zoom to) bookmark located near the top of the display. Click on the County (Zoom to) bookmark and select the desired county name from the list in the popup window.
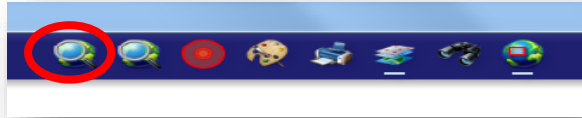


5. You can also zoom to a specific INDOT District by using the District (Zoom to) bookmark located near the top of the display. Click on the District (Zoom to) bookmark and select the desired INDOT District name from the list in the popup window.



6. The layer list toolbox allows you to toggle on/off which layers are displayed in the view. Use the arrows to expand the main folders in the list (Projects and Map Insert), and the checkboxes to toggle the layers on/off. Several of the layers are off by default, which means they will not be visible until you check the box to make them visible.
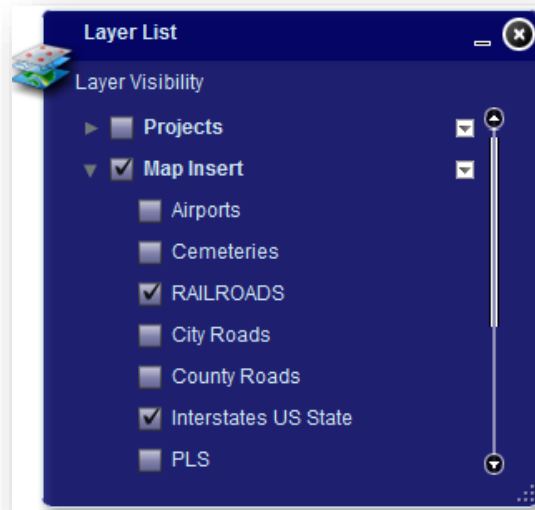
7.  Once you have the area you are interested in displayed and the desired layers turned on, you can use the Export Map Image toolbox to create the Map Insert.
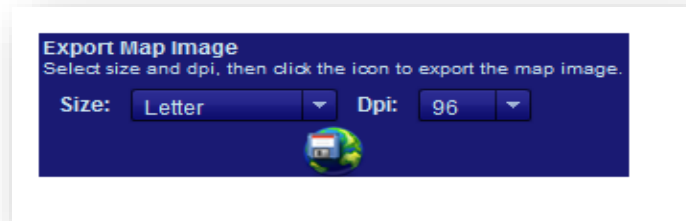


8.  Choose the appropriate layout size from the Size dropdown list.  You may need to test the sizes to find the desired output.  To export the entire screen display choose Current View.
9.  Choose the appropriate DPI (dots per inch) setting from the Dpi dropdown list.  Typically when inserting into a Microstation CAD drawing the minimum required is 300 dpi.
10. Once the options are set as desired click on the Export Map Image icon to create the image file.
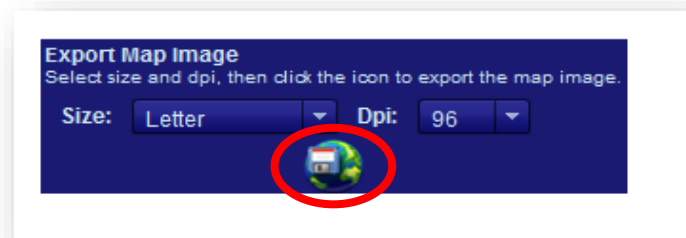


11. A new internet explorer window will open displaying the exported map image. It may take a few moments for the image to export especially when a larger size and dpi are selected. If you are satisfied with the map, right click and choose Save Picture As...  Navigate to the desired storage folder location.  Change the Save as Type to Bitmap (*.bmp) and type the filename you would like the image to be stored as. Select Save and the image will be exported to the folder location you chose.
12. Use the Raster Manager toolbox within MicroStation to insert the image into your CAD file/ base sheet.

# 1. Appendices

## 1.1 Appendix B - Naming Conventions

Good naming is required to alleviate many problems when sharing data. The following are recommended names for various design resources.

*Note: Throughout Appendix B, LineA is used to indicate a generic alignment*

### 1.1-1 InRoads DTM Names

Uniform model naming is necessary to insure consistency between users and to allow for continuity when projects are passed from one designer to another, or when multiple designers work on the same project. The following list is compiled based on historically used models/surfaces at INDOT.

Tables begin on the next page:

| DTM Name | Contents |
|---|---|
| Des | Proposed design Strings |
| Des LineA | Proposed design Strings for line LineA |
| Des Alignments | Proposed Alignments |
| Des Culvert | Box & Three Sided Culverts Structures |
| Des Pipes | Drainage Culverts Structures |
| Des Drive | Drives (if separated from other design strings) |
| Des Subgrade LineA | Subgrade model for line LineA |
| Des TEMP RUNAROUND | Temporary Runaround Strings |
| Underdrain LineA | Underdrains |
| Hydraulic Surface LineA | Ditches |
| Sections LineA | Cross Sections for line LineA |
| Survey alignment | Alignments Created by Survey Unit |
| Volumes LineA | Volumes calculated along LineA |
| Topo | Existing Topography information from Survey (provided by the Survey Unit) |
| Topotria | Triangulated Topo model |
| Excont | Existing Contours (provided by the Survey Unit) |
| Prcont | Proposed Contour Models |
| Merge LineA | Model containing design strings from LineA and topo strings outside the limits of the design |
| Alternate Naming, Used for larger more complex projects | |
| Des Roads | Contains Proposed Design strings for all alignments |
| Des Final | Contains all proposed design strings with all gaps and editing completed |
| Merge Roads | Model containing design strings from all alignments and topo strings outside the limits of the design |
| Merge Final | Model containing design strings from all alignments and topo strings outside the limits of the design |

*Note:  Not every project will need every type of suggested model nor is the user restricted to only create the models listed above.  Many additional temporary models can be created while using the GUI.*

### 1.1-2   MicroStation Drawing Names

Note:    Please abbreviate .dgn names as needed using the INDOT standard abbreviations

I.e. Sht – Sheet, MOT - Maintenance of Traffic, etc

**nn** is used to denote the drawing number for drawings with multiple sheet numbers 001, 002, 003, etc.

Tables begin on the next page:

| Description | Drawing File Name | Examples |
|---|---|---|
| *Road Project* | | |
| Title Sheet | Sht Title.dgn | |
| Drawing Index and General Notes | Sht Index.dgn | |
| Typical Cross Sections | Sht Typical_nn.dgn | Sht Typical_07.dgn |
| Survey Route (Plat No. 1) | Sht Plat1_nn.dgn | Sht Plat1.dgn<br>Sht Plat1_05.dgn |
| Survey Route Plat with Aerial Photography (Plat No. 3) | Sht Plat3_nn.dgn | Sht Plat3.dgn<br>Sht Plat3_05.dgn |
| Geometric Tie-Up | Sht Geometric Tie_nn.dgn | Sht Geometric Tie.dgn<br>Sht Geometric Tie_01.dgn |
| Traffic Maintenance Details | Sht MOT_nn.dgn | Sht MOT 02.dgn |
| Plan and Profile | Sht PlanProfile_scale_nn.dgn | Sht PlanProfile_50_01.dgn |
| Superelevation-Transition Diagram | Sht Super_nn.dgn | Sht Super.dgn<br>Sht Super_01.dgn |
| Details | | |
| Construction Details | Sht Const Detail_scale_nn.dgn | Sht Const Detail_30_01.dgn |
| Intersection Details | Sht Intersection_scale_nn.dgn | Sht Intersection_30_01.dgn |
| Spot Elevation Details | Sht Spot Elev_nn.dgn | Sht Spot Elev.dgn<br>Sht Spot Elev_01.dgn |
| Channel Details | Sht Channel_nn.dgn | Sht Channel_01.dgn |
| Geometric Details | Sht Geom Detail_nn.dgn | |
| Right-of-Way Details | Sht ROW Detail_nn.dgn | Sht ROW Detail.dgn<br>Sht ROW Detail_01.dgn |
| Grading Plan | Sht Grading_scale_nn.dgn | Sht Grading_30_01.dgn |
| Drainage Details | Sht Drainage_nn.dgn | Sht Drainage_01.dgn |
| Erosion and Sediment Control Details (plan view) | Sht TEC_scale_nn.dgn | Sht TEC_30_01.dgn |
| Retaining Wall Details | Sht Retaining Wall_nn.dgn | Sht Retaining Wall.dgn<br>Sht Retaining Wall_01.dgn |
| Wetland Mitigation Details | Sht Mitigation_scale_nn.dgn | Sht Mitigation_30_01.dgn |
| Traffic-Work Details | | |
| Signs (if separate traffic-sign plans are not required) | Sht Signs_nn.dgn | Sht Signs.dgn<br>Sht Signs_01.dgn |
| Signals | Sht Signal_scale_nn.dgn | Sht Signal_30_02.dgn |
| Lighting (if separate lighting plans are not required) | Sht Lighting_nn.dgn | Sht Lighting.dgn<br>Sht Lighting_01.dgn |
| Pavement Markings | Sht Pvmt Markings_scale_nn.dgn | Sht Pvmt Markings_30_03.dgn |
| Road Summary Sheet | Sht Road Summary.dgn | |

| Description | Drawing File Name | Examples |
|---|---|---|
| **Bridge Project** | | |
| Title Sheet | Sht Title.dgn | |
| Index | Sht Index.dgn | |
| Typical Cross Sections | Sht Typical Cross Sections.dgn | |
| Traffic Maintenance Details | Sht MOT_nn.dgn | Sht MOT_02.dgn |
| Traffic Detour Details | Sht Detour_nn.dgn | |
| Temporary Runaround Details | Sht Runaround_scale_nn.dgn | Sht Runaround_50_02.dgn |
| Road Plan and Profile | Sht PlanProfile_scale_nn.dgn | Sht PlanProfile_50_01.dgn |
| Superelevation-Transition Diagram | Sht Super_nn.dgn | Sht Super.dgn<br>Sht Super_01.dgn |
| Roadway Details (see Road Plan sheets) | | |
| Traffic-Work Details (see Road Plan sheets) | | |
| Soil Borings | Sht Borings TB_nn.dgn | Sht Borings TB_01.dgn |
| Channel Change Layout | Sht Channel_nn.dgn | Sht Channel_01.dgn |
| Layout | Sht Layout_scale_nn.dgn | Sht Layout_30_01.dgn |
| General Plan | Sht General Plan.dgn | |
| Structure Details | Sht Structure.dgn | |
| Abutment/Bent/Pier Details | Sht End Bent Details_nn.dgn<br>Sht Pier No x_nn.dgn | Sht End Bent Details_02.dgn<br>Sht Pier No 2 and 3_01.dgn |
| Framing Plan | Sht Framing Plan.dgn | |
| Structural Steel Details or Precast-Concrete Beam Details | Sht Beam Details_nn.dgn | Sht Beam Details_01.dgn |
| Bearing Details | Sht Bearings.dgn | |
| Superstructure/Floor Details | Sht Superstructure_nn.dgn | Sht Superstructure_02.dgn |
| Railing Details | Sht Railing Details.dgn | |
| Screeds | Sht Screed_nn.dgn | Sht Screed_02.dgn |
| Reinforced-Concrete Bridge Approach Details | Sht Approach Slab Details nn.dgn | Sht Approach Slab Details_02.dgn |
| Bridge Summary | Sht Bridge Summary.dgn | |
| Road Summary | Sht Road Summary. dgn | |
| Pipe Materials | Sht Materials.dgn | |
| Cross Sections | Sht Xsec_scale_nn.dgn | Sht Xsec_50_03.dgn |

| Description | Drawing File Name | Examples |
|---|---|---|
| Traffic-Signs Project | | |
| Title Sheet | Sht Title.dgn | |
| Index and General Notes | Sht Index.dgn | |
| Signing Plan | Sht Signing Plan_nn.dgn | Sht Signing Plan_01.dgn |
| Sign Layout | Sht Panel Sign Layout_nn.dgn<br>Sht Sheet Sign Layout_nn.dgn | Sht Panel Sign Layout_01.dgn / Sht Sheet Sign Layout_01.dgn |
| Cross Sections | Sht Sign Cross Sections.dgn | |
| Sign Summary | Sht Panel Sign & Post Summary_nn.dgn<br>Sht Sheet Sign & Post Summary_nn.dgn | Sht Panel Sign & Post Summary _01.dgn<br>Sht Sheet Sign & Post Summary_01.dgn |
| Footing Details | Sht Signal Footing Details.dgn | |
| Structural Details | Sht Structural Details.dgn | |
| Signalization Project | | |
| Title Sheet | Sht Title.dgn | |
| Index and General Notes | Sht Index.dgn | |
| Signal Plan | Sht Signal Plan.dgn | Sht US 41 & SR 57 Signal Plan.dgn |
| Signal Details | Sht Signal Details.dgn | |
| Lighting Project | | |
| Title Sheet | Sht Title.dgn | |
| Index and General Notes | Sht Index.dgn | |
| Lighting Plan | Sht Lighting Plan.dgn | |
| Cross Sections | Sht Lighting Cross Sections.dgn | |
| Lighting Details | Sht Lighting Details.dgn | |

The following files are required as part of the GIS Data Standards and Validation process. More information on this process can be found in Chapter 9, Section 4.

| GIS Deliverables | | |
|---|---|---|
| GIS Existing Plan | Des #_GIS_explan_stg #.dgn | |
| GIS Proposed Plan | Des #_GIS_prplan_stg #.dgn | |
| GIS Right of Way Plan | Des #_GIS_rwplan_stg #.dgn | |

| Standard Base Drawings | | |
|---|---|---|
| Drawing Names / Logical Names | Descriptions / Reference Descriptions | Examples |
| Survey Alignment | Survey Centerline | Survey Alignment.dgn |
| Survey Section Corner | US Government Section Corners | Survey Section Corner.dgn |
| Survey Contours | Survey Existing Contours | Survey Contours.dgn |
| Survey Topography | Survey Existing Topography | Survey Topography.dgn |
| Survey Triangulation | Existing Triangulation | Survey Triangulation.dgn |
| Explan scale | Design Existing Topography | Explan 50.dgn<br>Explan 100.dgn |
| Excont scale | Survey Existing Contours | Excont 50.dgn<br>Excont 100.dgn |
| Prplan scale | Proposed Design Strings | Prplan 50.dgn<br>Prplan 100.dgn |
| Prcont scale | Proposed Contours | Prcont 50.dgn<br>Prcont 100.dgn |
| RW Existing scale | Existing Right of Way | RW Existing 50.dgn<br>RW Existing 100.dgn |
| Annotate Alignment mcac scale | Proposed Alignment Annotation | Annotate alignment mcac 50.dgn<br>Annotate alignment mcac 100.dgn |
| Annotate Survey Alignment mcac scale | Survey Alignment Annotation | Annotate survey alignment mcac 50.dgn |
| Annotate station offset mcac scale | Annotation of Survey points with station and offset | Annotate station offset mcac 50.dgn |
| Annotate survey points mcac scale | Annotation of Survey points | Annotate survey points mcac 50.dgn |

| Standard Sheet Drawings | | |
|---|---|---|
| Drawing Names | Descriptions | Examples |
| Planprofile mcac scale n | Plan & profiles drawings | Planprofile mcac 50 001.dgn<br>PlanProfile mcac 50 002.dgn<br>PlanProfile mcac 50 n.dgn |
| Layout mcac scale n | Bridge layout sheet | Layout mcac 50 001.dgn<br>Layout mcac 50 002.dgn<br>Layout mcac 50 n.dgn |
| Const det mcac scale n | Construction details drawings | Const det mcac 50 001.dgn<br>Const det mcac 50 002.dgn<br>Const det mcac 50 n.dgn |
| Pvmt Markings scale n | Pavement marking details | Pvmt Markings 50.dgn<br>Pvmt Markings 50 01.dgn<br>Pvmt Markings 50 02.dgn<br>Pvmt Markings 50 n.dgn |
| Runaround mcac scale n | Temporary Runaround plan profile drawings. | Runaround mcac 50 001.dgn<br>Runaround mcac 50 002.dgn<br>Runaround mcac 50 n.dgn |
| TEC det mcac scale n | Temporary Erosion Control details | TEC det mcac 50 01.dgn<br>TEC det mcac 50 02.dgn<br>TEC det mcac 50 n.dgn |
| Intersection Det scale n | Intersection details | Intersection det 50 n.dgn |

For Sheets created by InRoads, the pertinent Plan Profile Generator Preference should set the default naming appropriately.  If this name is incorrect, adjust as necessary.

For all of the above InRoads created sheets, the alignment name, scale, and sheet number indicates which alignment, scale, and sheet number is reflected.  Following this convention will allow easy differentiation between alignments and scales.

## 1.2    Appendix C - MicroStation Libraries

### 1.2-1    DGN Library

A DGN library is a DGN file used to store:

- Text styles
- Dimension styles
- Levels (Filters)
- Models

These are shared within the workgroup as standards.  A DGN library is sometimes referred to as a DGN lib (pronounced with a long 'I'). The recommended file extension for this file is *.dgnlib. Cells/Models, dimension styles, levels, and text styles are created in a DGN library using MicroStation tools, the same way they are created in a DGN file. INDOT DGN libraries are now automatically attached as part of the ProjectWise Managed Workspace.  Be aware that if you're not working out of ProjectWise, INDOT specific tools, levels, and customizations will not be available to you.

### 1.2-2    Text Styles

#### 1.2-2a    What is a Text Style?

MicroStation supports text styles and provides an interface for constructing text using available system fonts and a wide variety of text attributes. A text style comprises a group of text attributes, such as font type, width, height, and color. Text styles enable you to place text within a model in a consistent and automated manner.

The following fonts are supported natively in MicroStation:

- Traditional MicroStation fonts
- TrueType fonts
- AutoCAD Shape fonts (.shx)

*Tip1.*  Fonts are not embedded in the DGN file.

*Tip2.*  If a specific font is not found on the system, MicroStation substitutes font #127, Fast Font.

*Tip3.*  If a Text Style changes in a Text Style library, Text Styles placed in DGN files prior to the change are not automatically updated in the DGN files. To update a DGN file to reflect the changes in the Text Style library, use the dgnlib to *Update from Library* from the text styles dialog.

#### 1.2-2b    INDOT Text Styles

Text styles at INDOT have been changed in this new workspace to be more in line with their size and use rather than related to the section of INDOT as in previous workspaces.  With the release of this version of the workspace, INDOT has now standardized the use of Tahoma as the primary font used, except in limited circumstances.

You will notice that the Text Styles are now using only True Type fonts. This gives us more flexibility with Bold and Italics settings. The Bentley fonts will only be provided where necessary and will not be available for new projects. The following tables will show you the settings for each Text Style.

| Text Style Name | Font | Height (in.) | Width (in.) | Notes/Guidelines for Use |
|---|---|---|---|---|
| Text Styles for D-Size Plan Sheets | | | | |
| 10 Point Text | Tahoma | 0.10 | 0.10 | May be used for table data. |
| 10 Point Text (Existing Elevations) | Tahoma | 0.10 | 0.08 | (Italic, Color 222) Use for existing-grade elevations on grid of plan and profile view. |
| 10 Point Text (Survey Text) | Arial Narrow | 0.10 | 0.10 | (Color 225) Use for selected survey text. |
| 12 Point Text | Tahoma | 0.12 | 0.12 | Use for text callouts, dimensions, and notes. Minimum size for text placed on D-size plans other than text specified under 10 Point Text. |
| 14 Point Text | Tahoma | 0.14 | 0.14 | Use for selected text on title block, view subtitles, and column headings in tables. |
| 14 Point Text (Property Owners) | Bookman Old Style | 0.14 | 0.14 | Use for parcel-owner text only. |
| 18 Point Text | Tahoma | 0.18 | 0.18 | Use for detail and section titles, and table titles on detail sheets. |
| 30 Point Text | Tahoma | 0.30 | 0.30 | Use for selected text on title sheet of plans. |
| GIS Annotation – Full Size | Tahoma | 30 | 30 | Used for annotation of GIS Required elements as noted in Chapter 9.4. |
| Text Styles for Ltr-Size Plan Sheets | | | | |
| 6 Point Text | Tahoma | 0.06 | 0.06 | May be used for table data, existing-grade elevations on grid of plan and profile view, and selected survey text. |
| 7 Point Text | Tahoma | 0.07 | 0.07 | Use for selected text on title block. Column headings in tables, and parcel-owner text. |
| 7 Point Text (Survey Text) | Arial Narrow | 0.07 | 0.07 | (Color 222) Use for selected survey text. |
| 9 Point Text | Tahoma | 0.09 | 0.09 | Use for text callouts, dimensions, notes, column headings in tables, and parcel-owner text. Minimum size for all text placed on letter-size plans, other than text specified under 6 Point Text. |
| 12 Point Text | Tahoma | 0.12 | 0.12 | Use for selected text on title sheet of plans. |
| 14 Point Text | Tahoma | 0.14 | 0.14 | Use for detail and section titles, and table titles on detail sheets. |

NOTES:

1. All styles are set to 0.65 (exact) line spacing.
2. All styles are Center-Center justified initially.

3. All styles are non-bold and non-italic and should remain so unless indicated otherwise above.

*(Values in the preceding chart are representative of a 1 to 1 scale)*

There are additional styles provided from the Bentley default configuration. These named styles come from the PrintPreparation.dgnlib and are not used in the INDOT workflow.

### 1.2-3    Dimension Styles and Settings

MicroStation dimension styles allow you to save dimension settings by name. This allows for greater unity between groups of dimensions in the file, as several different styles can be used for various models or portions of a model. Dimension styles are managed through the Dimension Styles Settings dialog box.

### 1.2-3a        INDOT Dimension Styles

As with Text Styles, we have made significant changes to our Dimension Styles at INDOT.  The first change you will notice is the Dimension Styles Settings dialog box is different.  It gives the users more options and breaks the settings down into categories like Geometry, Units, and Text.  There is also a preview window at the bottom allowing you to preview the style prior to using it.  We have combined all of the old V8 Dimension Styles into 13 styles (4 for full size sheets, 4 for letter size sheets, 2 for architectural sheets, and 3 for standards drawings).  These Dimension Styles relate to the size of text and are linked to the appropriate Text Style.  The following tables will show you the settings for each Dimension Style:
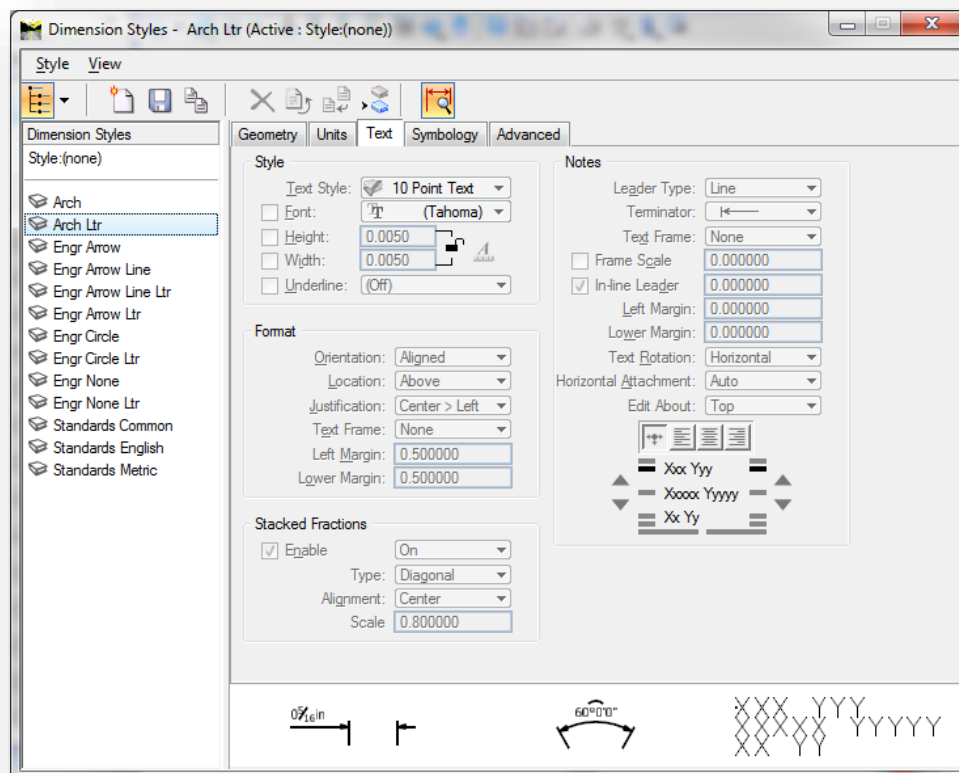
| Dimension Style Name | Text Style | Units | Notes / Settings |
|---|---|---|---|
| **Dimension Styles for D-Size Plan Sheets** | | | |
| Arch | 12 Point Text | MU label-SU label, round to nearest 1/16 | Arrow terminator, no text frame |
| Engr Arrow | 12 Point Text | MU label, round to nearest 0.01 | Arrow terminator, no text frame |
| Engr Arrow Line | 12 Point Text | MU label, round to nearest 0.01 | Arrow terminator, line text frame |
| Engr Circle | 12 Point Text | MU label, round to nearest 0.01 | Circle terminator, no text frame |
| Engr None | 12 Point Text | MU label, round to nearest 0.01 | No terminator, no text frame |
| GIS Notation | GIS Annotation – Full Size | MU label, round to nearest 0.01 | Arrow terminator, no text frame |
| **Dimension Styles for Ltr-Size Plan Sheets** | | | |
| Arch Ltr | 9 Point Text | MU label-SU label, round to nearest 1/16 | Arrow terminator, no text frame |
| Engr Arrow Ltr | 9 Point Text | MU label, round to nearest 0.01 | Arrow terminator, no text frame |
| Engr Arrow Line Ltr | 9 Point Text | MU label, round to nearest 0.01 | Arrow terminator, line text frame |
| Engr Circle Ltr | 9 Point Text | MU label, round to nearest 0.01 | Circle terminator, no text frame |
| Engr None Ltr | 9 Point Text | MU label, round to nearest 0.01 | No terminator, no text frame |

NOTES:

1. All styles are set to use Working Units.
2. All styles are set to Dynamic Justify text notes.

*(Values in the above chart are representative of a 1 to 1 scale)*

## 1.3    Appendix D - MicroStation Advanced References

### 1.3-1  Models

A Model gives you the ability to store multiple independent sets of design data within the same file.
*(For additional information on models, see Chapter 6 of the V8 Update manual)*

*(See* Appendix H *for Model – Sheet Use chart and proper model names)*

## *1.3-1a*      *Model Properties*
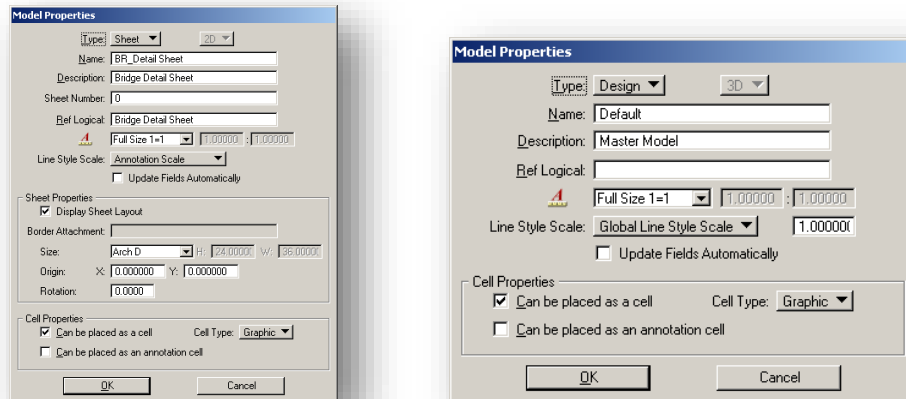


**Model Properties dialog box for Design (left) and Sheet (right)**

### Type

Sets the model's type (Design or Sheet) and dimensionality (2D or 3D).

### Name

Sets the model's name.

### Description

Sets the model's description.

### Ref Logical

Sets the Reference Logical name for the model. The logical name identifies the model when the DGN file is attached to another file as a reference (see the Reference Attachment Setting dialog box).

### Annotation Scale

The Annotation Scale icon displays the status of the Annotation Scale lock: on or off. When placing text, the lock must be on to ensure that text is placed at the defined scale.

The option menu sets the scale for text and dimensioning in the model. You can select from a list of common scales, or select CUSTOM and input your own scale in the fields immediately to the right. Additional scales have been enabled in the Managed Workspace.

Switching to InRoads has changed philosophy in regards to the use of annotation scale.  Any non-InRoads sheet will continue to use these tools, however those sheets generated either with the Plan and Profile Generator or those created from the Cross Sections tools are maintained at 1:1 scale with the borders scaled up to the data.  In these instances, all features, including linestyles, are scaled independently of the Annotation Scale settings.

*Display Sheet Layout*

(Sheet Model only) If on, a sheet element will display in the new sheet model.

*Size*

(Sheet Models only) Sets the sheet size. Standard sheet sizes are available from the drop-down menu, or you can select Custom and input your own size values in the H and W fields. The H and W fields are disabled when a standard sheet size is chosen.

*Origin*

(Sheet Models only) Sets the origin of the sheet.

*Rotation*

(Sheet Models only) Sets the rotation angle of the sheet, measured in degrees counter-clockwise from the x-axis (horizontal).

*Can be placed as a cell*

If on, it is possible to place the model as a cell. (Should be checked by default)

*Cell Type*

Sets the cell type (Graphic or Point). This option menu is enabled only if *Can be placed as a cell* is on.

*OK*

Accepts the changes and closes the dialog box.

*Cancel*

Closes the dialog box without making any changes.

### 1.3-2   Drawing Scale

The Drawing Scale window is used to adjust drawing scale settings. These settings are particularly relevant to the process of creating sheet models for drawing production.

To open the Drawing Scale window, navigate to *MicroStation > Settings > Drawing Scale.*

*Drawing Scale window*

The Drawing Scale window is a dockable window that contains controls for viewing and/or modifying working units, the annotation scale factor, and the Annotation Scale Lock.
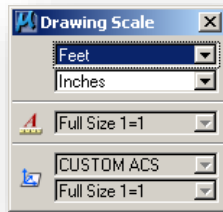
Drawing/Annotation Scale Dialog
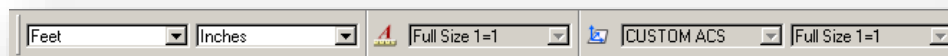


Drawing/Annotation Scale Docked

The units that display in the Master Units and Sub Units option menus can be customized by editing the file "units.def". The scale factors that display in the annotation scale option menu can be customized by editing the file "scales.def" (do not attempt to edit this file).

*Note: The selection of controls displayed in the Drawing Scale window can be customized by right-clicking in the window. The technique is the same as that for showing and hiding tools in tool boxes.*

### Master Units (option menu)

Sets the Master Units component of working units.

### Sub Units (option menu)

Sets the Sub Units component of working units.

### Annotation Scale (option menu)

Sets the annotation scale factor.

### Annotation Scale (Icon)

Sets the Annotation Scale Lock. When this lock is on, the annotation scale is applied to any text that is placed in the model.

### Scaling Definitions

The following charts represent the scales defined in the scales.def file.

*Note: The scales in this chart are to be used on metric sheets or US sheets (straight ratio) as well as metric base drawings when setting the annotation scale.*

| Scale Name | Scale Factor |
|---|---|
| Full Size 1=1 | 1:1 |
| 6"=1'-0" | 2:1 |
| 3"=1'-0" | 4:1 |
| 1 1/2"=1'-0" | 8:1 |
| 1"=1'-0" | 12:1 |
| 3/4"=1'-0" | 16:1 |
| 1/2"=1'-0" | 21:1 |
| 3/8"=1'-0" | 32:1 |
| 1/4"=1'-0" | 48:1 |
| 3/16"=1'-0" | 64:1 |
| 1/8"=1'-0" | 96:1 |
| 1/16"=1'-0" | 192:1 |
| 1/32"=1'-0" | 384:1 |
| 1"=10' | 120:1 |
| 1"=20' | 240:1 |
| 1"=30' | 360:1 |
| 1"=40' | 480:1 |
| 1"=50' | 600:1 |
| 1"=60' | 720:1 |
| 1"=100' | 1200:1 |
| 1"=200' | 2400:1 |
| 1"=300' | 3600:1 |
| 1"=400' | 4800:1 |
| 1"=500' | 6000:1 |
| 1"=600' | 7200:1 |
| 1"=1000' | 12000:1 |

### 1.3-3   Reference Files and Models

With the emphasis of the use of Models at INDOT it is very important to understand how they are used and how they can be referenced within a dgn (self referencing), to another DGN, and back (Cyclical referencing).

#### 1.3-3a      Using References

Elements in a reference display as though they were in the active model. Although you cannot manipulate the elements in a reference, you can snap to them and even copy them into the active model.

The most common usage of references is in the creation of design compositions. Design compositions are used by engineers and other technical professionals to communicate through the visual content of their designs.

To create a *design composition* using MicroStation, you build a design model consisting of a working collection of references used in the performance of particular engineering tasks. For example, you may attach as references a collection of survey points as a guide for placement of additional geometry. Reference attachments in a design composition are usually coincident.

It is sometimes convenient to refer to one part of a model while drawing in another area by attaching the active model to itself.

You can attach a redline file created using Bentley Redline to your model for reviewing purposes.

Another common usage of references is in the creation of drawings for publication. This task is called drawing composition. Whereas a design composition is typically contained in a design model, a drawing is composed in a sheet model.

### *1.3-3b*      *Attaching references*

The most common way to attach a reference is to attach it coincidentally, which means that the coordinates of the referenced model's design plane and optionally its Global Origin are aligned with those of the active model, without any rotation, scaling, or offset.

To attach a reference coincidentally:

From the File menu, choose Reference. (The References dialog box opens.)
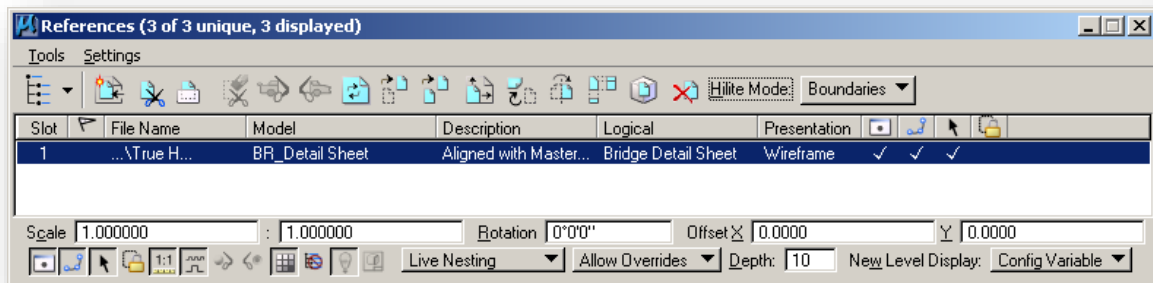


References Dialog

1. From the dialog box's Tools menu, choose Attach. Or In the Reference dialog box, right-click in the list box and choose Attach from the pull down menu. (The Attach Reference dialog box opens.)
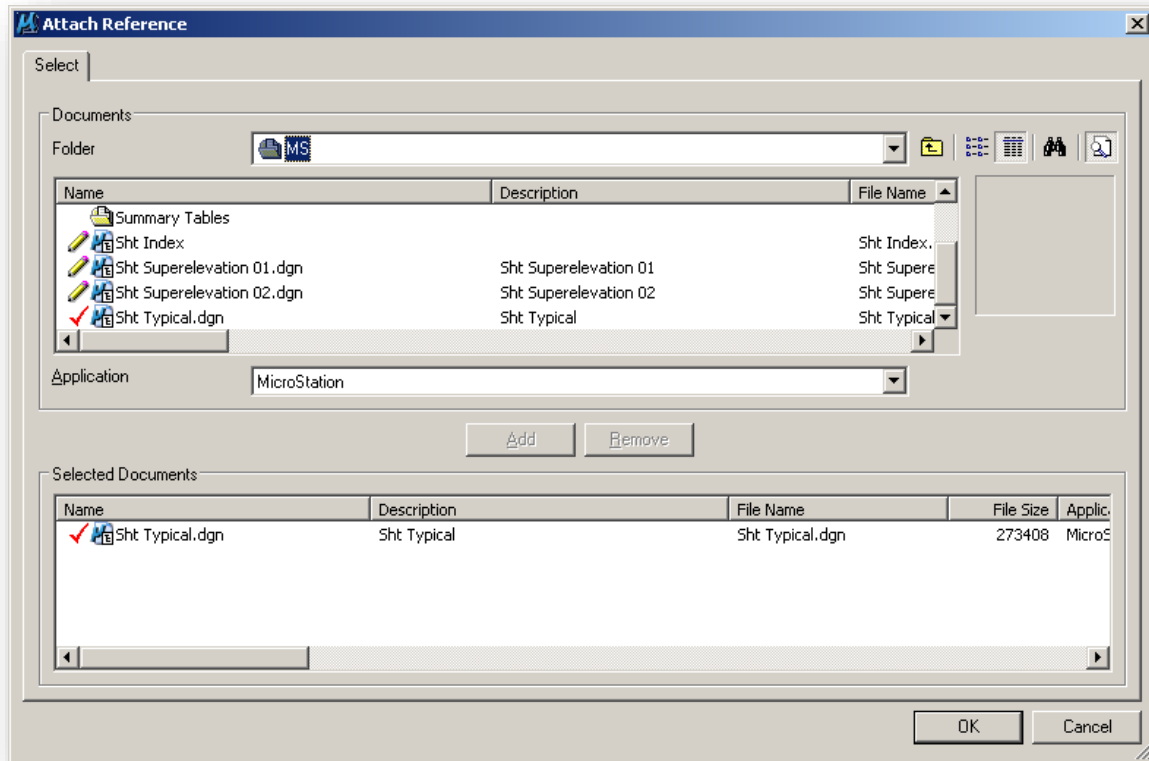
**ProjectWise Attach Reference Dialog**

2.  Select the DGN file that contains the model to attach as a reference and click ADD and then click OK.  (The Attach Reference Settings dialog box opens.)
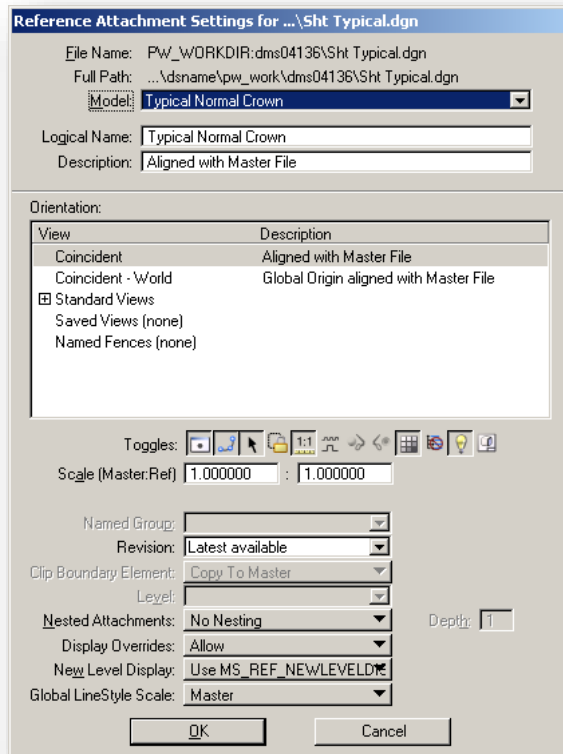
**Reference Attachment Settings**

3. (Optional) From the Model option menu, choose the model to attach.
4. The default is the reference's master model.
5. (Optional) (*unless the selected model is already attached*) In the Logical Name field, key in a brief name for the attachment.
6. (Optional) In the dialog box's Description field, key in a description of the model.
7. To align the reference with the active model with regard to both Global Origin and design plane coordinates, select Coincident - World in the Orientation list box. This option is available only when referencing a model in a DGN file. Or To align the reference with regard to design plane coordinates only, select Coincident in the Orientation list box.
8. (Optional) In the Scale (Master:Ref) fields, define the ratio of the active model's Master Units to the referenced model's Master Units. For example:

| To set | Left | Right |
|---|---|---|
| One active model master unit per referenced model master unit (the default). | 1 | 1 |
| Five active model master units per referenced model master unit. | 5 | 1 |

*Note: Since the same model can be attached many times, give the references logical names and descriptions that help you remember which reference is which.*

For further discussion on using reference manager please refer to Chapter 8 of the *Bentley Institute Course Guide, MicroStation V8 XM Edition User*.

### *1.3-3c  Working with nested references*

When a MicroStation design file used as a reference has its own attachments, they become nested references. The links between these files can be maintained through many levels (depths) of nesting, so that if you open only one file, you can view the contents of many files. The individual references can be updated, and the changes will be shown in the master (or parent) file. When you attach a parent reference to your model and turn on live nesting, you can also control how many levels of nested references are attached to the model.

*To attach a reference with live nesting*

1. In the Primary tool box, click the References icon. (The Reference dialog box opens.)
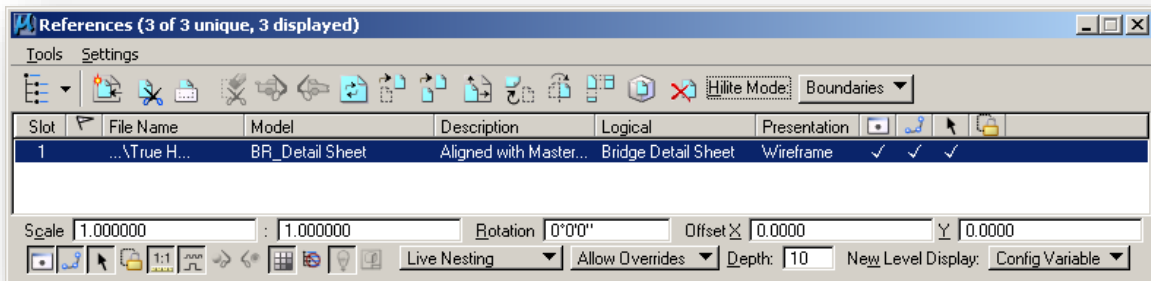


**References Dialog**

2. In the dialog box's tool bar, select the Attach Reference tool. (The Attach Reference dialog box opens.)
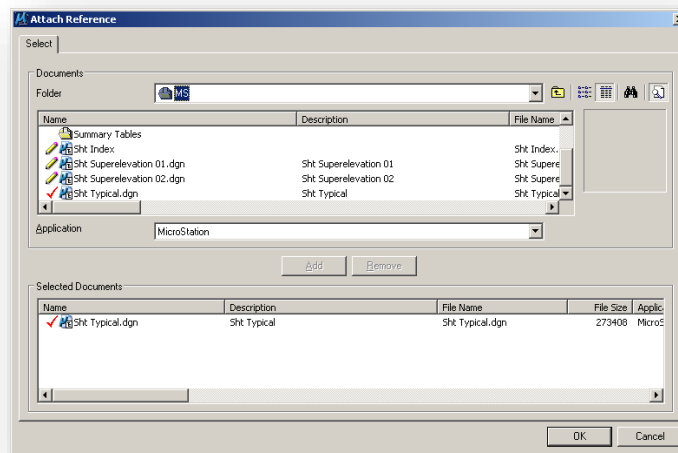


**ProjectWise Attach Reference Dialog**

3. Select the DGN file that contains the model to attach as a reference, and click OK. (The Attach References Settings dialog box opens.)
4. From the Nested Attachments options menu, choose Live Nesting.
5. The Nested Attachments options are only available when the selected model has referenced attachments. When the Live Nesting option is on, the hierarchical structure of any nested references are maintained when attaching the parent reference to a model. In MicroStation, a nested attachment is displayed only if the child reference does not have its Ignore Attachment When Live Nesting setting turned on (in the Attachment Settings dialog box), and the parent reference has Live Nesting enabled.
6. In the Nest Depth field, enter a high value (for example, 10).
7. Set the depth setting to a high number to include even the most deeply nested references. Although the nested attachments will display in the view window, you will see only the parent reference in the References dialog box's list box.

## Nested Attachments

Determines if referenced models attached to reference models (and so on) are recognized when a model is attached to the active model.

- No Nesting — Models attached to the attached model are not recognized in the active model.
- Live Nesting — Models attached to the attached model are recognized in the active model.
- Copy Attachments — Models attached to the attached model copied into the active model.

When working in a DWG or DXF file, live nesting is always on, and there is no limit to nest depth. Therefore the Nested Attachments and Depth items are disabled. To control the display of nested attachments, use the Ignore Attachment When Live Nesting setting (on the Attachment Settings dialog box).

## Nest Depth

Sets the number of levels of referenced models that are recognized. Models can have their own referenced models, which, in turn, can have more referenced models, and so on.

If Depth is set to 0, only the model is attached to the master model; referenced models in the referenced model are ignored.

MicroStation V8 includes the ability for live nesting of reference files. Essentially this means that referencing a file causes its children (and potentially their children) to be automatically referenced as well.

MicroStation allows two separate settings that control whether live nesting occurs. The first setting controls whether an attachment is displayed as a nested file. This setting is controlled through the "Ignore Attachment When Live Nesting" checkbox on the attachment settings dialog.

The second setting is subtly different than the "Ignore/Overlay" setting discussed above.

This setting controls whether children of a reference file are displayed at all and if they are displayed, the depth to which the children are nested.

The difference is that the parent attachment controls whether the children are displayed rather than the children themselves controlling their nested display. In MicroStation, a nested attachment is displayed only if the child does not have its "Ignore When Live Nesting" setting on AND the parent has live nesting enabled.

At a quick glance it would seem that it would be possible to simulate MicroStation's parental control of nest depth by creating Overlays whenever a parent attachment disables live nesting. Unfortunately this is not possible. Consider the example below:

A MicroStation design file a.dgn has a single reference b.dgn that is attached as a standard attachment (not an overlay). In MicroStation, it is possible to attach a.dgn as a reference and include the display of b.dgn (as in c.dgn) or to disable the display of children by turning off live nesting (as in d.dgn).
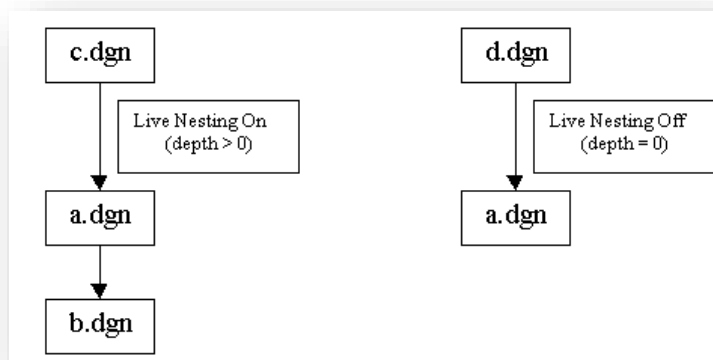
Nested Reference Map

**Circular Reference Map**

### 1.3-4 Levels

In the new unified workspace environment we have taken and combined the levels from all previous workspaces to eliminate redundancy and establish consistency throughout the agency. The total number of levels is now well over 650. Due to the large number of levels, Filters can be used to limit the level list to only those levels needed.

#### 1.3-4a Level Classifications

With the large number of levels that now exist in the INDOT CAD Workspace; a new level naming scheme has been created to assist in filter creation, and for consistent creation and categorization of levels.

Example:        P_RDWY_Guardrail

- P_ - First Position Prefix, indicates that the level contains information related to Proposed work
- RDWY_ - Second Position Prefix, indicates that the level contains information related to Roadway Features
- Guardrail - Brief Description, indicates that the level contains line work specifically related to Guardrail

The following table lists the new level classifications:

| First Position | Description | Second Position | Description |
|---|---|---|---|
| G_ | Ground Surface | SURF_ | Surface Features |
| P_ | Proposed | EW_ | Earthworks Features |
| RW_ | Right of Way | HY_ | Hydraulics Feature |
| S_ | Survey (TOPO) | RDWY_ | Roadway Feature |
| XS_ | Cross Section | ALG_ | Alignment |
| CG_ | COGO Points | BR_ | Bridge Features |
| PROF_ | Profile Features | CTRL_ | Survey Control |
| ST_ | Standards Drawings | DR_ | Drainage Features |
| PP_ | Plans Production | PROP_ | Property Features |
| BD_ | Border | RW_ | Right of Way |
| E_ | Existing Features (non-Survey) | TOPO_ | Topographical Features |
| | | TRAF_ | Traffic Features |
| | | UTIL_ | Utility Features |
| | | G_ | Graphical Feature |
| | | TC_ | Template Component |
| | | E_ | Existing Feature |
| | | OBJT_ | Object (Standards Only) |
| | | ANNO_ | Annotation (Standards Only) |
| | | REFR_ | Reference (Standards Only) |
| | | TTLB_ | Title Block (Standards Only) |
| | | TXT_ | Text |
| | | SHT_ | Sheet |

### *1.3-4b     Level Filters*

Filters are a useful way to group associated levels for the purposes of viewing or not viewing as a group. For example, you might have a DGN file with several hundred levels. Within these levels could be filters for different disciplines such as Bridge and Traffic. Within Bridge there might be levels for proposed or existing elements. You could easily define a filter called Bridge that would show only levels that would be associated with Bridge work.

Filters can be named, saved, and recalled as needed or defined on-the-fly for immediate one-time viewing using the Filter Row in the Level Manager dialog box. Filters can be turned on or off using the Level Display dialog box. Filters can be used to turn on or off levels across a model and all of its attached models.

Levels can be filtered by a number of attributes such as filename, color, style, line weight, and level groups, to name a few. To display the levels that are defined in a filter, select the Active Level filter

button from the Attributes toolbar and select the filter of choice.  This will display those levels only and turn off all other levels in the dgn.  Note that the levels will not actually be turned on or off, but the ability to view them in the Level Display will be dictated by the filter selected.

DOTWise now offers an updated set of filters for use within the CAD Workspace.  Due to the updated level naming convention, levels are now filtered by categorization instead of rigidly defined level definitions.  The following table explains the qualifications for the new filters:

| Filter Name | Description |
|---|---|
| Bridge | Level name contains _BR_ |
| Bridge - Existing | Level name starts with S_BR_ or E_BR_ |
| Bridge - Proposed | Level name starts with P_BR_ |
| COGO | Level name starts with CG_ |
| Cross Section Components | Level name starts with XS_TC_ |
| Drainage | Level name contains _DR_ |
| Drainage - Existing | Level name starts with S_DR_ or E_DR_ |
| Drainage - Proposed | Level name starts with P_DR_ |
| Rehab | Custom Level filter as specified by Bridge Rehab |
| Right of Way | Level name contains RW_ |
| Right of Way - Existing | Level name starts with S_RW_ or E_RW_ |
| Right of Way - Proposed | Level name starts with RW_ |
| Roadway | Level name contains _RDWY_ |
| Roadway - Existing | Level name starts with S_RDWY_ or E_RDWY_ |
| Roadway - Proposed | Level name starts with P_RDWY_ |
| Sheet Component | Level name contains BD_, PP_, XS_G_ |
| Sheet Component - Border | Level name contains BD_ |
| Sheet Component – Cross Section | Level name contains XS_G_ |
| Sheet Component – Plans Production | Level name contains PP_ |
| Standards | Level name starts with ST_ |
| Survey | Level name starts with S_ |
| Survey - Bridge | Level name starts with S_BR_ |
| Survey - Drainage | Level name starts with S_DR_ |
| Survey - Property | Level name starts with S_PROP_ |
| Survey - Right of Way | Level name starts with S_RW_ |
| Survey - Roadway | Level name starts with S_RDWY_ |
| Survey - Surface | Level name starts with S_SURF_ |
| Survey - Survey Control | Level name starts with S_CTRL_ |
| Survey - TOPO | Level name starts with S_TOPO_ |
| Survey - Traffic | Level name starts with S_TRAF_ |
| Survey - Utilities | Level name starts with S_UTIL_ |
| Triangulation and Contours | Level name starts with G_SURF_ |

## 1.3-5   Design File Settings

Under Settings> Design File you will see the following screen:
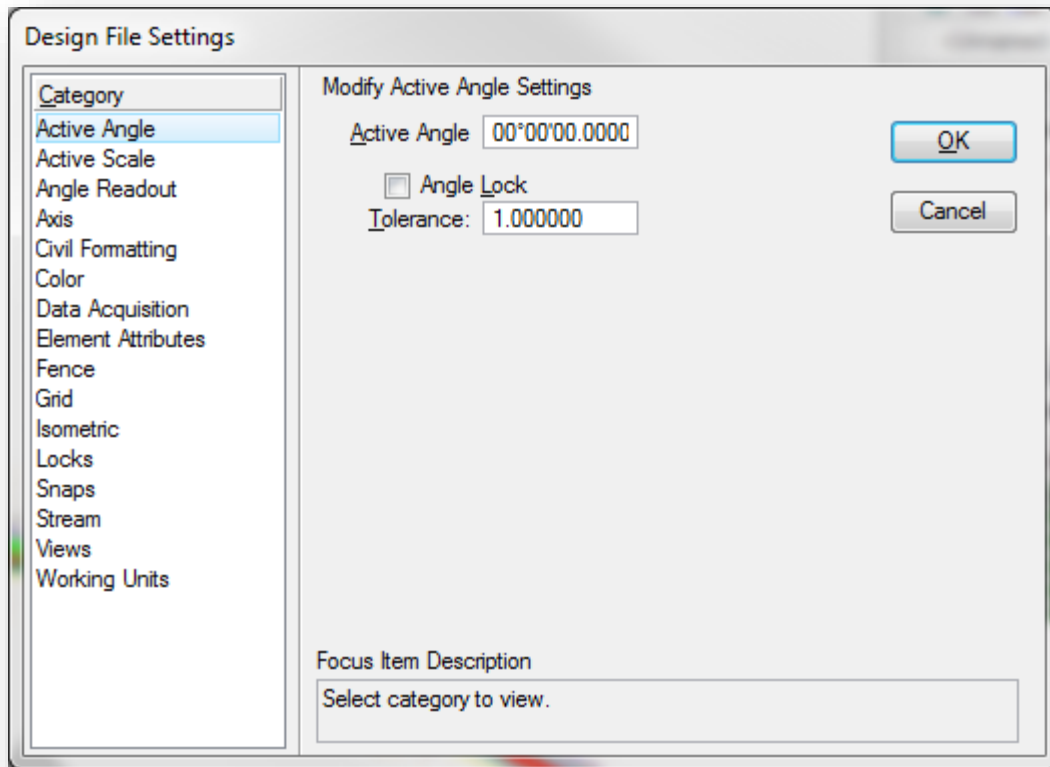
**Design Files**

### Active Angle

Sets the Active Angle — the angle, in degrees, used with tools that require an angle specification, including the Place Line, the Place Active Cell, the Place Text, the Rotate, and the Construct Array.

### Active Scale

Consists of controls that are used to set the active scale factors and to toggle Scale Lock.

### Angle Readout

Controls how coordinates are reported.

### Axis

Consists of controls that are also available in the Locks dialog box. (Settings menu > Locks > Full)

Axis Lock: If on, each data point is forced to lie at an angle (or multiples of that angle) from the previous data point. The angle is specified by the (Axis) Increment relative to the (Axis) Start Angle.

### Civil Formatting

Controls display of Civil Geometry functions and features.

*Color*

Consists of controls that are used to modify the color settings in the elements and the dynamic X pointer.

*Data Acquisition*

Defines Data Acquisition settings such as the active XIN in use, along with various file type operations.  (Data Acquisition must be started for this panel to be active.)

*Element Attributes*

Color, line style, line weight, class, level, and fill.

*Fence*

Consists only of a control used to set the fence selection mode.

*Grid*

Consists of controls that are used to set Grid Lock and the grid's spacing and configuration.

*Grid Lock*

If on, each data point is forced to lie on the grid.

*Isometric*

If on, each data point is forced to lie on the Isometric Plane.

*Locks*

Consists of controls that are also available in the Locks dialog box.

Text Node Lock: If on, newly placed text is attached to empty text nodes, and you cannot place text if there aren't any empty text nodes.

Level Lock: If on, you can select elements only on the Active Level; you cannot manipulate elements that are not on the Active Level.

Graphic Group: If on, any manipulation performed on one member of a graphic group is automatically performed on all members.

　　　If off, the member elements of a graphic group can be manipulated individually.

Boresite: (3D only) If on, you can select or snap to elements at any depth in the view cube.

　　　If off, you can select (with a data point) only those elements that are at or very near the Active Depth. Still you can snap to elements at any depth.

ACS Plane: (3D only) If on, each data point is forced to lie on the Active ACS's XY plane (z=0). Still you can snap to elements at any depth.

The Active ACS is set in the Auxiliary Coordinates System dialog box, which is opened by choosing Auxiliary Coordinates from the Utilities menu.

### *Snaps*

Consists of controls that are also available in the Locks dialog box.

Association:

If on, an association point is created each time an element is snapped to: Dimensioning tools, the Place Multi-line tool, the Place Active Cell tool or Use Shared Cell.

ACS Plane Snap:

(3D only) If on, and AccuDraw is active, the first snap point is forced to lie on the Active ACS's XY plane (z=0).

Depth Lock:

(3D Only) If on, each tentative point is projected along the view z-axis at the Active Depth.

### *Stream*

Consists of controls that are used to set how data points are sampled while using the Place Stream Line String tool and the Place Point or Stream Curve tool.

Stream Delta:

Sets the minimum distance, in working units, between sampled points (vertices in the stream line string or curve).

When the distance between the pointer's location and the previously sampled point exceeds the Active Stream Delta, the point is sampled and the Tolerance, Stream Angle, and Stream Area are applied to see if a data point should be recorded.

Stream Tol(erance):

 Sets the maximum distance, in working units, between recorded data points. The distance from the most recently recorded data point is checked for each sampled point. If that distance exceeds the active stream Tolerance, the sampled point is recorded as a data point.

### *Views*

To edit Pixel width and Height in the corresponding view.

### *Working Units*

The units in which the current dgn is working in.

### 1.3-6   Seed Files – (Template Documents)

The following paragraph is quoted from the *Bentley Institute Course Guide* titled *ProjectWise V8 XM Edition User*.

"A ProjectWise template is the same as a Microsoft template, or a seed file in MicroStation.  It is a file that is copied to create a new document.  You can use a document stored in ProjectWise or document that resides outside ProjectWise as a template."

All Seed files can be found under the Template Documents\Seed folder in ProjectWise.  Each set of seed files (Template Documents) resides within a sub folder describing their specific use. (Example: MicroStation files are stored in the MicroStation folder).

*Documents\Template Documents*
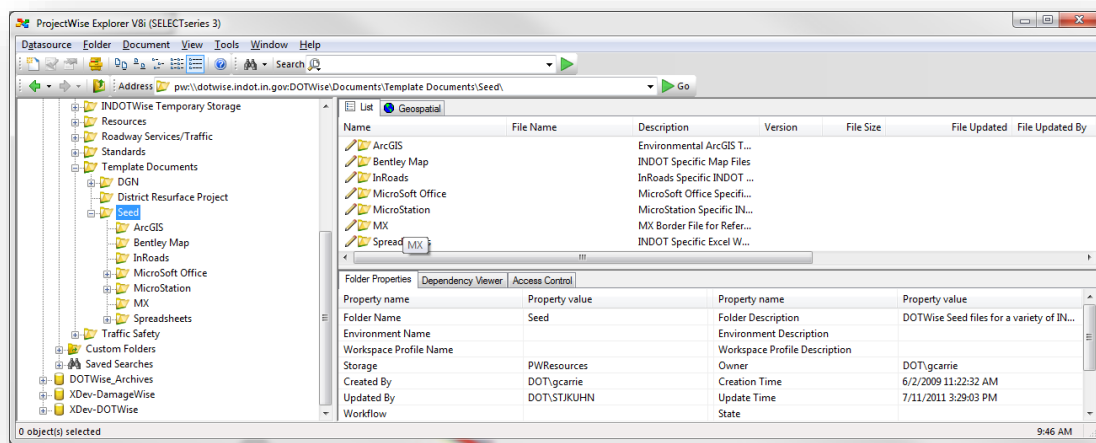


ProjectWise Template Documents

### 1.3-7   Structure of a V8 Design File

We've had a number of requests from users for a chart that shows the "structure of a design file" for an understanding of which settings are stored globally and which are stored with the model. The following image is only intended for learning purposes and is *not* a technical representation of the design file structure:

ANY.DGN
    Active Design Settings
        Angle
        Colour
        Level
        Line Style
        Line Weight
        Scale

    Other Design Settings
        Colour
            Drawing Pointer
            Element Highlight
            Selection Set
        Coordinate Readout
        Fence Mode
        Rendering
        Snaps
        View Settings

    Locks
        ACS Plane
        Axis
        Boresite
        Graphic Group
        Level
        Text Node

    Definitions
        Dimension Styles
        Levels
        MultiLines
        Tag Sets
        Text Styles

    Hidden Model
        Transient Elements

    Model #1
        Graphical Elements
        Grid Units
        Grid Configuration
        Isometric Lock
        Saved Views
        Stream Settings
        View Attributes
        Working Units

    Model #2
        Graphical Elements
        Grid Units
        Grid Configuration
        Isometric Lock
        Saved Views
        Stream Settings
        View Attributes
        Working Units

DGN Feature Map

### 1.3-8   Cell Libraries

With the move to a ProjectWise Managed Workspace, cells should no longer be directly referenced from outside MicroStation.  All Cell Libraries can be found on the *Cell Libraries/Tools* task in the MicroStation interface.

### 1.3-9   Using Place Cell Along for MOT Barrels

1. Attach the IN_Symbols cell library from either the INDOT Tools -> Cell Libraries -> Symbols Lib task navigator or Element -> Cells and File -> Attach Library.
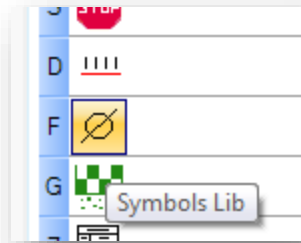
2. In the cell selector, activate RD_MOT Barrel for Placement by double clicking on it.
3. Start the Cell Tools from the task navigator under INDOT Tools -> Cell Libraries -> Load Cell Tools button.
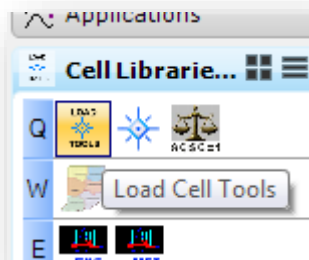


4. Select the Place Cell Along tool from the Cell Tools toolbox.
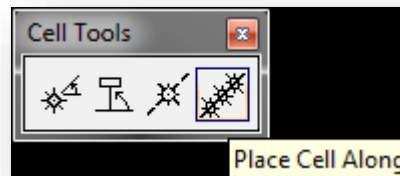


5. The RD_MOT Barrel is already active from selecting placement earlier. At this time you can adjust the spacing as needed, along with the angle and offset.
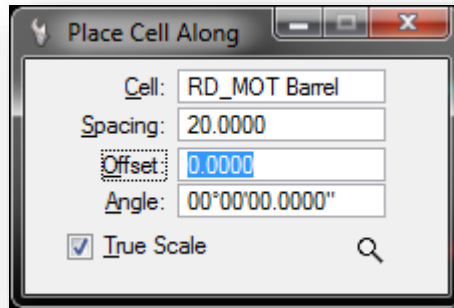
6. When satisfied with the settings, click on the line you'd like to place the cells along. Your initial selection point will be the starting point of the cells, so if you require a certain point, make sure to tentative snap to it. Note that the placement of the cell is always in the direction of the element.
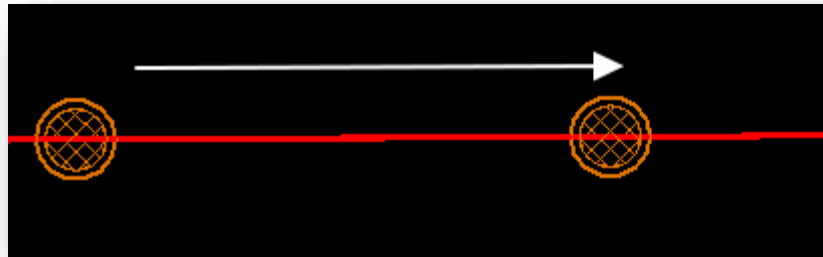


7. The Offset value should be used when you want to adjust which side of the linear element you'd like to place the cells. Each of the following illustrations shows how the cells behave with a linear element drawn from right to left:
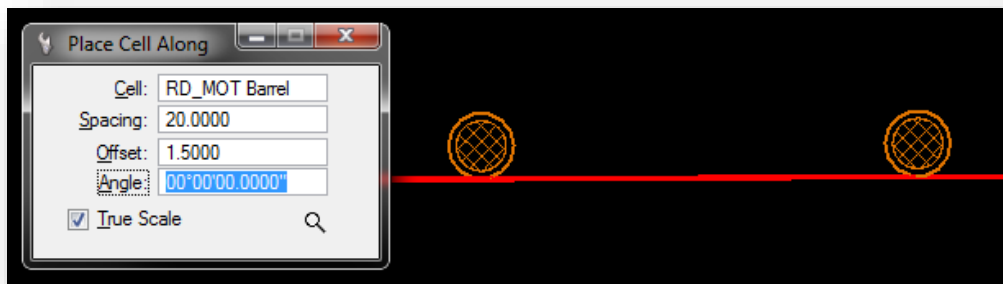


Cells are placed at a positive 1.5 offset, on a line drawn along a line from left to right.
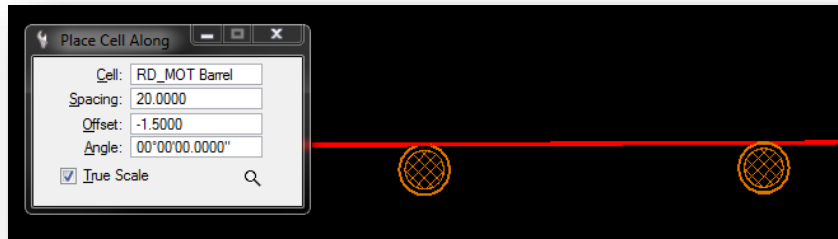
Cells placed at a negative -1.5 offset, on a line drawn along a line from left to right.

A Few Items of Note:

a. This tool does work with complex chains and graphic groups, so it will work along an alignment
b. Each cell is a distinct element, so they can be modified after placement without affecting other cells placed along the element.
c. There is no way to limit the number of occurrences of cell placement, as this tool will place cells along an element to where it ends.

## 1.4 Appendix E - True Scale Linestyles

To accommodate the usage of linestyles that were created for use at a 1:1 scale, workflow changes are required to use these linestyles and have them display properly. This document will explain the linestyles affected and the appropriate way to use these linestyles with the V8i workspace.

### *Linestyles Referred to in this Document*

The procedures in this document apply to a specific subset of linestyles available in the V8i workspace. Originally, these linestyles were created to measure exact sizes when drafted at a 1:1 scale. The affected linestyles are as follows:

| cl 4 lane undiv | ex. c & g – 8 |
|---|---|
| cl left pass | ex. curb – 4 |
| cl no passing | ex. curb – 6 |
| cl passing | ex. curb – 8 |
| cl right pass | exaggerated left pass |
| Crosswalk | exaggerated no passing |
| curb & gutter - 4 | exaggerated right pass |
| curb & gutter - 6 | RPM 40ft |
| curb & gutter - 8 | RPM 80ft |
| curb – 4 | skip turning |
| curb – 6 | Skips |
| curb – 8 | stop line |
| ex. c & g – 4 | Striping |
| ex. c & g – 6 | TWLTL |

## Appropriate Usage of these Linestyles

With changes made to linestyle scaling procedures, it is not possible to use these linestyles with annotation scaling. As these styles are already created to be true scale when drafted at 1:1, any additional multiplier selected by annotation scale will then proceed to distort the display of the linestyles by the scale selected.

With these issues in mind, a new workflow has been developed to allow for continued usage of these linestyles while allowing the usage of Annotation Scale with all other linestyles.

To properly use these linestyles, they must be drafted separately from your base model. In your Model Dialog, you will need to create a new model.
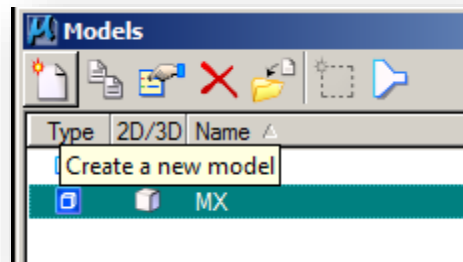


**New Model Creation**

For this model, the properties will need to be set as shown:

**Model Linestyle Scale Settings**

The most important setting for the model where these linestyles will be placed is the Line Style Scale. As these linestyles cannot use Annotation Scale, the model properties need to reflect the Line Style Scale as being set by "Global Linestyle Scale" with a scale value of 1.0 as shown in the previous illustration. If these settings are not properly set, your model will not reflect the true scaling of these linestyles.

Once you have created this model, you will then need to reference your base drawing into this model. There are no specific settings required for the attachment of your base drawing. This is attached to allow you to draft your striping and will not be plotted. At this point, you may begin drafting using these true scale linestyles.

As this model does not reflect the annotation scaling of your base drawing, you will then need to reference your true scale linestyle model into your base drawing. When attaching this model, you will want the attachment to show the following settings to properly show the true scale linestyles.
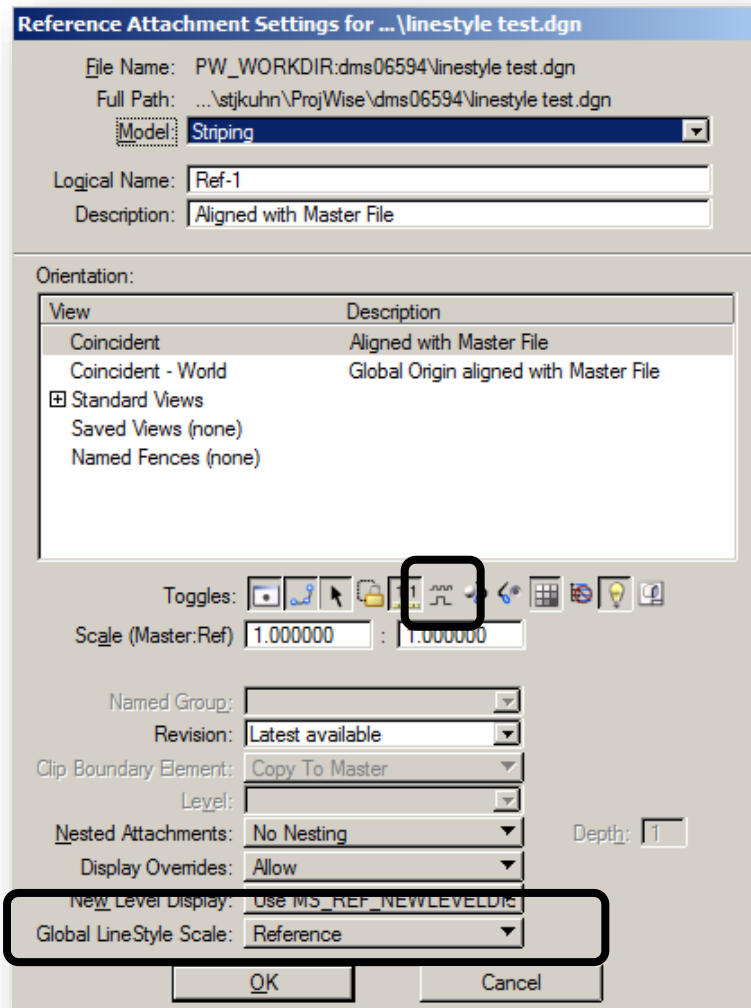
**Reference Attachment Settings**

As shown in the prior illustration, you will want to make sure that the toggle for "Scale Linestyles by Reference Scale" is disabled and that the "Global Linestyle Scale" is set to Reference. These settings will instruct MicroStation to show the linestyles in that reference attachment by their true scale, as defined by the model.

If you do not set the prior settings when you attach your model, you will need to make sure the attachment properties are as illustrated on the following page:

**Reference Linestyle Scale Settings**

As with the prior attachment settings, on this panel you will want to have "Global Linestyle Scale" set to reference, and have the option for "Scale Line Styles" disabled.

*Warning:  These settings are only to be used when the true scale linestyles are used.  If these settings are used with any other models and references, they may provide undesirable scaling and display issues.*

## 1.5      Appendix F - MicroStation Tips and Functionality

### 1.5-1   Task Navigation Tips

Task Navigation can be displayed horizontally as well as the default vertical.  As with other tool bars in MicroStation, tools can be stretched and reoriented.  The default placement for this toolbar is on the right side of the MicroStation window displayed vertically.

*Note*: Tasks icons have Letters in the lower left corner.
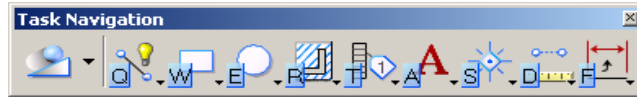
The task list icon allows users to select the appropriate task.



The default tasks are drawing and drawing composition.  Since some tasks require the same tools, tasks can include some of the same tools.

*<PgUp>*: will go to the next task in the task list

*<PgDown>*: will go to the previous task in the task list

The task list can be expanded where the plus symbols exist.
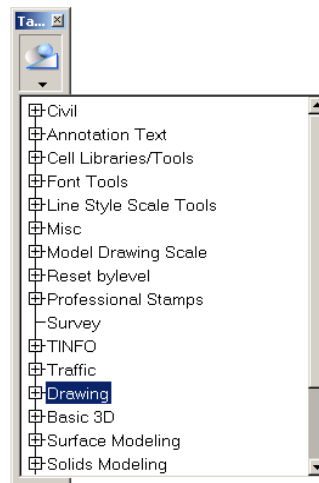


Certain tasks are subs to other tasks as illustrated on the following page:

The resulting toolbar would look as follows:



*Hint*: Simplification of Tasks can be achieved by changing how tasks are displayed in the user preferences. Users who are new to MicroStation and or PowerDraft may not know what an icon is indicating. This modified view shows the icons in conjunction with text describing the tools.

To implement this change, users should select from the Cad menu. *Workspace -> Preferences -> Category -> Task Navigation -> Task Navigation Preferences – Presentation -> Dialog.*



Resulting Task Navigation dialog:

Sub items can select when the *expand arrow* exists.

Open as toolbox allows users to work as with previous versions of MicroStation.

### 1.5-2   Positional keyboard Mapping

Positional mapping allows users to access commands by selecting the items from the Keyboard.  The keyboard is divided into zones to group access to commands.

# Position Mapping

Positional keyboard navigation is a technique to map user-defined zones of the keyboard to logical collections of interface items.  This technique lets you use the keyboard to select tools, open dialogs, and change settings.

These Keys are mapped to the Main toolbar.

These keys are mapped to the task toolbar.

These keys are mapped to tool settings.
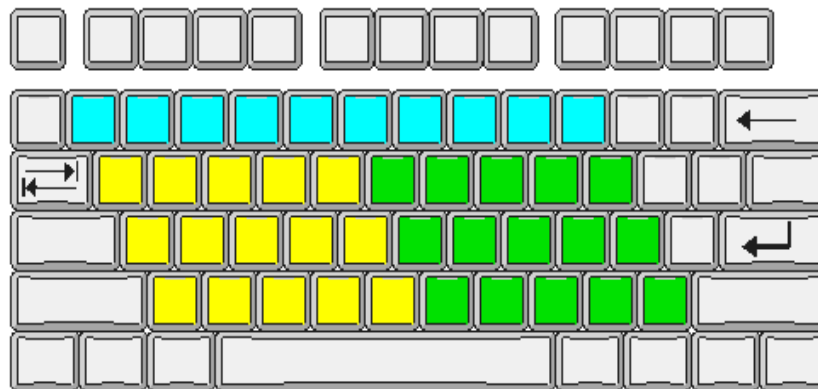
### 1.5-3   Dialog Focus

MicroStation manages the inputs from users for positional mapping by managing the focus (or part of MicroStation you are currently interacting with) Feedback is provided to the user on the MS status bar in the lower right.  Focus is indicated with the following icons:

Home focus,    tool settings window,    Key-in,    AccuDraw

When at home focus, the keyboard key selected corresponds to the tool selected. Home focus also allows tools to be changed. To return to home focus Press *Esc*

When placing an element, focus may move to tool settings (as settings are changed), to AccuDraw (as precision input is provided) during placement, and then to home.

Access Tools in the Main Toolbox with Positional mapping:

With focus at home, pressing a number will access the main tool box. For Example selecting 3 will open a menu at the current cursor location listing the manipulate tools. Pressing a second number, let's say 1, will access copy. Remember Esc returns dialog focus to home.

Some examples of the sequence would be:

- Esc -> 3 ->3          Scale
- Esc -> 7 ->1          Modify element
- Esc -> 4 ->4          Window Area

Access Tools in Task Navigation with Positional mapping.

With focus at home, pressing a letter will access the task toolbox. For Example, selecting Q will open a menu at the current cursor location listing the tools. Pressing a second entry, let's say 2, will access Place line. Remember Esc returns dialog focus to home.

Some examples of the sequence would be:

- Esc -> Q ->1          Place Smart line
- Esc -> A ->1          Place Text
- Esc -> D ->5          Measure Area
- Tips:     <space> Switches focus to AccuDraw

### 1.5-4   View toolbar

The view toolbar has been repositioned at the top left of the View window. The default view toolbar for 3D drawings has the following icons. The icons are referenced as listed starting at 1 from left to right.



1. View Attributes. Used to select, control and change the type of elements and graphic attributes in the information displayed in the view.
2. View Display Mode. Used to quickly set and customize the display mode such as wireframe, hidden lines, filled, etc.
3. Adjust View Brightness. Used to quickly adjust lighting in the drawing.
4. Update View. Used to refresh the active view.
5. Zoom In. Increase the magnification of a view.
6. Zoom Out. Decrease the magnification of a view.

7. Window Area. Use to magnify an area of the display, in the selected view.
8. Fit View. Used to fit the entire display in a view. Further specific options are available.
9. View Rotation. Used to rotate the display in a view. Select from Top View or one of the other nine variations of rotation available from the fly-out tool bar.
10. Pan view. Used to move (pan) the display without changing the view magnification. Move the display under the cursor by holding the left mouse button down and moving the cursor around the screen.
11. Walk. Used in 3D drawings to show a walking perspective along a path.
12. View Previous. Cancels the last view control operation and returns you to the previous view.
13. View Next. Applies the last undone view control operation.
14. Copy View. Used to copy the active view settings to another view.
15. Change View Perspective. Change the perspective angle of a 3D view.
16. Clip Volume. Clips a view so no elements outside a defined boundary are visible.
17. Clip Mask. Used to clip visible areas in a view.

### 1.5-5    Mouse Operations

Mouse functionality has been slightly modified and enhanced.  The graphic below illustrates current default settings.  Changes to defaults are discouraged.

| | Send Focus to Home |
| --- | --- |
| Esc | |
| Enter | Pop-up the key-in browser at the cursor |
| Tab | Cycle between elements under the cursor |
| Space Bar | Send Focus to AccuDraw |
| Q ... O | Position Mapping for the Main toolbox |
| Q ... B | Position Mapping for the current Task |
| Q ... M | Position Mapping for the toolsettings |

**Wheel Button**

| | | |
| --- | --- | --- |
| Drag | Pan |
| Shift | Drag | Rotate (basic) |
| Ctrl | Drag | Swivel camera (3D only) |
| Alt | Drag | Rotate (advanced) |
| Double Click | | Fit |
| Roll | | Zoom in/out |
| Shift | Roll | Pan with Zoom |
| Ctrl | Roll | Walk forward/backward (3D only) |
| Alt | Roll | Pan left/right |

**Primary Mouse Button**

| | | |
| --- | --- | --- |
| Click | | Datapoint |
| Shift | Click | Dynamic Pan |
| Ctrl | Click | Continue Selection (tool specific) |
| Alt | Click | Match Attributes FromCursor |
| Drag | | Define start and end points |
| Double Click | | Default menu action (object specific) |
| Shift | Ctrl | Drag | Overlapping Selection / Invert AccuSnap |

**Secondary Mouse Button**

| | | |
| --- | --- | --- |
| Click | | Reset / Right Click |
| Shift | Click | View control pop-up menu |
| Ctrl | Click | Display the Main toolbox at the pointer location |
| Alt | Click | Element Quickinfo FromCursor |
| Shift | Ctrl | Click | Display the current Task tools at the cursor |

Changes to note:        Tentative snapping requires a simultaneous left and right mouse click.

Additions:              *Double middle click (wheel)* performs Fit View
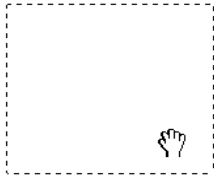
*Press and hold middle* is pan



*Shift Lt* is Dynamic pan

*Roll wheel forward and back* is zoom in and out

### 1.5-6   Missing buttons and Toolbars

Right Click to customize the menu Icons displayed.

RT click on nearly every menu allows the user to select which icons are included.
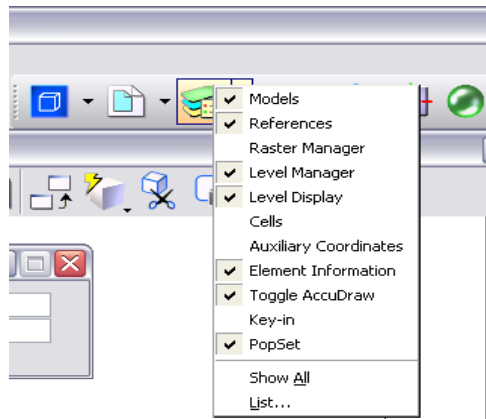


Select by *left clicking* on items to add or remove items.  Only items with checks will be displayed.



The *standard toolbar*

Have you been looking for this toolbar?  It is off by default.

To activate it select *CAD Menu -> Tools -> Standard.*

### 1.5-7   Button Bar

Using the Button Bar to constantly monitor or change snaps will help users to properly utilize CAD snaps at all times.  This is especially beneficial when used in conjunction with AccuSnap.  *CAD Menu -> Settings Snaps -> Button Bar*

### 1.5-8 Save Settings

Retaining changes to Menus.

Changes made to customize toolbar layouts and other Menu changes can be retained from one user session to the next by Saving Settings.

Access save setting from the *CAD menu -> File -> Save Settings.*

Alternately, *CTRL + F*

## 1.6 Appendix G - GIS Conversion Matrix

The following level and file list are the requested Levels for Consumption into GIS.  The base files listed are expected locations of the data requested, however the documented process covers the complete recreation of these elements into 3 new files to eliminate unnecessary data such as profiles and cross sections.  Further information can be found in Chapter 9, Section 4.

| Design Base File | Asset | Data Type | Layer Name |
|---|---|---|---|
| *Des #_GIS_explan.dgn* | | | |
| | Aparent Existing Right of Way | Line | RW_AppExistingRW |
| | Existing Right of Way | Line | RW_ExistingRW |
| | Monumentation (Project Control) | Point | S_CTRL_aerial cross |
| | Monumentation (Project Control) | Point | S_CTRL_Aerial survey tilt |
| | Monumentation (Project Control) | Point | S_CTRL_Bench mark |
| | Monumentation (Project Control) | Point | S_CTRL_Boat spike |
| | Monumentation (Project Control) | Point | S_CTRL_Brass plug |
| | Monumentation (Project Control) | Point | S_CTRL_CheckShot |
| | Monumentation (Project Control) | Point | S_CTRL_County Benchmark |
| | Monumentation (Project Control) | Point | S_CTRL_Countyline Marker |
| | Monumentation (Project Control) | Point | S_CTRL_Drill hole in Conc |
| | Monumentation (Project Control) | Point | S_CTRL_GPS control |
| | Monumentation (Project Control) | Point | S_CTRL_INDOT BM |
| | Monumentation (Project Control) | Point | S_CTRL_INDOT flood control BM |
| | Monumentation (Project Control) | Point | S_CTRL_Instr or alignmt |
| | Monumentation (Project Control) | Point | S_CTRL_Iron pin |
| | Monumentation (Project Control) | Point | S_CTRL_Iron pipe |
| | Monumentation (Project Control) | Point | S_CTRL_Mon |
| | Monumentation (Project Control) | Point | S_CTRL_Nails-MagNail |
| | Monumentation (Project Control) | Point | S_CTRL_Nails-PkNail |
| | Monumentation (Project Control) | Point | S_CTRL_Point-Fly Stations 1 |
| | Monumentation (Project Control) | Point | S_CTRL_Point-Resection Pts |
| | Monumentation (Project Control) | Point | S_CTRL_Point-Traverse Pts 1 |
| | Monumentation (Project Control) | Point | S_CTRL_Railroad spike |
| | Monumentation (Project Control) | Point | S_CTRL_Rebar |
| | Monumentation (Project Control) | Point | S_CTRL_Road nail |

| | | | |
|---|---|---|---|
| Monumentation (Project Control) | Point | S_CTRL_section Cor traver |
| Monumentation (Project Control) | Point | S_CTRL_State line marker |
| Monumentation (Project Control) | Point | S_CTRL_Stone Mon |
| Monumentation (Project Control) | Point | S_CTRL_Wood stake |
| Existing Catch Basin | Point | S_DR_Catch basin |
| Existing Catch Basin, Round | Point | S_DR_Catch Basin Round |
| Existing Catch Basin, Square | Point | S_DR_Catch Basin Square |
| Existing Culvert | Point | S_DR_Culvert |
| Ditch Line | Line | S_DR_Ditch line |
| Existing Inlet Curb | Point | S_DR_Inlet-curb |
| Existing Inlet Drop | Point | S_DR_Inlet-drop |
| Existing Intermittant Stream | Line | S_DR_intermittent small strm |
| Ordinary High Water | Line | S_DR_Ordinary High Water |
| Swamp-Marsh-Wetland | Line | S_DR_Swamp-marsh-wetland |
| Water Flow line | Line | S_DR_Water flow line |
| Existing Water's Edge | Line | S_DR_Waters edge |
| Toe of Slope | Line | S_SURF_Toe of slope |
| Existing Top of Bank | Line | S_SURF_Top of bank |
| Existing Riprap | Line | S_TOPO_Riprap |
| Existing Manhole | Point | S_UTIL_Manhole-drainage |
| Existing Storm-Sanitary Sewer | Line | S_UTIL_Ug-storm san sewer |
| Existing Storm Sewer | Line | S_UTIL_Ug-storm sewer |

**Des #_GIS_prplan.dgn**

| | | | |
|---|---|---|---|
| Project Stationing Alignment | Line | P_ALG_Horizontal Align Points |
| Project Stationing Alignment | Line | P_ALG_Horizontal Curves |
| Project Stationing Alignment | Line | P_ALG_Horizontal Spirals |
| Project Stationing Alignment | Line | P_ALG_Horizontal Tangents |
| Project Stationing Alignment | Line | P_ALG_Horizontal -Text |
| Project Stationing Alignment | Line | P_ALG_Profile-Text |
| Project Stationing | Point | P_ALG_Stationing |
| Project Stationing | Point | P_ALG_Ticks |
| Project Stationing Alignment | Line | P_ALG_Vertical -Text |
| Proposed Catch Basin | Point | P_DR_Catch Basin |
| Proposed Culvert | Point | P_DR_Culvert |
| Proposed inlet | Point | P_DR_Inlet |
| Proposed Storm Sewer | Line | P_DR_Storm Sewer |
| Proposed Flow Line | Line | P_HY_Flowline |
| Construction Limits | Line | P_RDWY_Constr Limits |
| Permanent Right of Way | Line | P_RDWY_Right-of-way Permanent |

**Des #_GIS_rwplan.dgn**

| | | | |
|---|---|---|---|
| Proposed Right of Way | Line | RW_ProposedRW |
| Temporary Right of Way | Line | RW_TemporaryRW |

## 1.7 Appendix H – Reference Documentation

The following references include a wealth of information to supplement the documentation in this publication.  Included are standards, policy, and procedural information outside the scope of this document and are provided as an end user reference should further information be needed.

INDOT CAD Support Site – http://www.in.gov/indot/3084.htm

INDOT Design Manual - http://www.in.gov/indot/design_manual/index.htm

Land & Aerial Survey Office - http://www.in.gov/indot/2715.htm

Standards & Specifications - http://www.in.gov/dot/div/contracts/standards/index.html

## 1.8 Appendix I – DOTWise Change log

### 1.8-1 DOTWise 3.1 Change log (Released 9/14/12)

#### 1.8-1a MicroStation Resources

INDOT_Font.rsc

- Has been removed to eliminate font conflicts with SignCAD resources and to further integrate common resources in the form of True Type fonts.
- For existing projects at 75% completion, these fonts will be re-enabled on request.

IN_Symbols.cel

- Now includes cell versions of the special characters from the now depreciated Arial 141 font.

IN_TablesLegendNotes.cel

- Updated DS_ table cells to use Upper Case Tahoma titles, and Mixed Case for all other text

All Cell Libraries

- Adjusted all font instances to now use Tahoma instead of Arial, both True Type and Bentley 141.

IN_Interface.dgnlib

- Help -> INDOT – INFO -> Map Insert Page now points to the new version
- All customized INDOT Tasks have been moved to an INDOT Tools Workflow Task
- Adjusted Annotation Templates to use new text levels

IN_Symbology.dgnlib

- Adjusted Letter Size Dimension Styles to use 9 pt fonts.
- Adjusted Full Size Dimension Styles to use 12 pt fonts.
- Removed Special Character Text Styles.
- Various adjustments/fixes to Text/Dimension Styles for uniform appearance and usage.

- Added Silt Fence linestyle
- Updated Level Naming Convention for all levels
- Updated Standards Level Filter
- Renamed Levels
    - Text - Spec Year -> BD_TXT_Spec Year
    - Text –Notes ->BD_TXT_Notes
    - Text - Eng Units -> BD_TXT_Eng Units
    - Text - Spec Year 2008 -> BD_TXT_Spec Year 2008
    - Sheet Attribute Exchange -> BD_SHT_Attribute Exchange
    - Sheet Border -> BD_SHT
    - Sheet Border – Frame -> BD_SHT_Frame
    - Sheet Border – Text -> BD_SHT_Text
    - Sheet Numbering -> BD_SHT_Numbering
    - Sheet Table Gridlines -> BD_SHT_Table Gridlines
    - Sheet Table Text -> BD_SHT_Table Text
    - Batch Plot Border -> BD_Batch Plot Border
    - Border Title block Final Plans Electronic Seal -> BD_Title block Final Plans Electronic Seal
    - Title Block Integration -> BD_Title Block Integration
    - Signature and Date -> BD_Signature and Date
- New Levels
    - BD_SHT_Legend
    - BD_SHT_Map Image
    - BD_SHT_Map Text
    - BD_SHT_North Arrow
    - BD_SHT_Text
    - E_BR_Joint
    - P_ALG_Horizontal
    - P_ALG_Horizontal -Text
    - P_ALG_Profile-Text
    - P_ALG_Stationing
    - P_ALG_Ticks
    - P_ALG_Vertical
    - P_ALG_Vertical -Text
    - P_BR_Approach Slab
    - P_BR_Backfill
    - P_BR_Barrier Delineator
    - P_BR_Bridge
    - P_BR_Bridge - Text
    - P_BR_Cofferdam
    - P_BR_Concrete Railing
    - P_BR_Concrete Railing Transition
    - P_BR_Crash Wall
    - P_BR_Deck Drains

- P_BR_Elastomeric Brg Pad
- P_BR_End Bent Drain Pipe
- P_BR_Joint
- P_BR_Leveling Pad
- P_BR_Pier
- P_BR_Piles
- P_BR_Piles - Text
- P_BR_Prestressed Beam
- P_BR_Prestressing Strands
- P_BR_Reinforcing Epoxy Coated
- P_BR_Reinforcing Plain
- P_BR_Screed Lines
- P_BR_Steel Beam
- P_BR_Steel Plate
- P_BR_Steel Studs
- P_BR_Structural Concrete
- P_BR_Structural Steel
- P_BR_Terminal Joint
- P_BR_Text-Description
- P_BR_Text-Details
- P_BR_Text-Dimensions
- P_BR_Text-Notes
- P_BR_Text-Tables
- P_BR_Text-Titles
- P_BR_Wall Landscaped
- P_BR_Wall MSE
- P_BR_Wall Retaining
- P_DR_Casting
- P_DR_Catch Basin
- P_DR_Culvert
- P_DR_Headwall
- P_DR_Inlet
- P_DR_Manhole
- P_DR_Pipe
- P_DR_Pre Cast Structure
- P_DR_Pre Cast Structure - Text
- P_DR_Sanitary Sewer
- P_DR_Storm Sewer
- P_DR_Text
- P_DR_Text
- P_DR_Underdrain
- P_DR_Wingwall
- P_EW_Slope Toe
- P_RDWY_Bench Mark Information
- P_RDWY_Check Dam-Riprap

- P_RDWY_Check Dam-Straw Bale
- P_RDWY_Construction Limits
- P_RDWY_Construction Limits-Text
- P_RDWY_Construction Limits-Text
- P_RDWY_Curb Inlet Protection
- P_RDWY_Ditch Inlet Protection
- P_RDWY_Ditch Lining Limits
- P_RDWY_Ditch Profile Left
- P_RDWY_Ditch Profile Left-Text
- P_RDWY_Ditch Profile Left-Text
- P_RDWY_Ditch Profile Left-Text
- P_RDWY_Ditch Profile Right
- P_RDWY_Ditch Profile Right-Text
- P_RDWY_Ditch Profile Right-Text
- P_RDWY_Ditch Profile Right-Text
- P_RDWY_Drive Centerline
- P_RDWY_Drive Edge
- P_RDWY_Drive Shoulders
- P_RDWY_Drive-Text
- P_RDWY_Drive-Text
- P_RDWY_Erosion Control
- P_RDWY_Erosion Control-Text
- P_RDWY_Geotextile
- P_RDWY_Guardrail
- P_RDWY_Guardrail Profile-Text
- P_RDWY_Guardrail-Text
- P_RDWY_Mulching
- P_RDWY_Paved Ditch
- P_RDWY_Project Limits-Text
- P_RDWY_Project Limits-Text
- P_RDWY_Reference Points
- P_RDWY_Retaining Wall
- P_RDWY_Riprap
- P_RDWY_Riprap-Class 1
- P_RDWY_Riprap-Class 2
- P_RDWY_Riprap-Revetment
- P_RDWY_Riprap-Uniform
- P_RDWY_Sediment Basin
- P_RDWY_Sediment Trap
- P_RDWY_Seeding
- P_RDWY_Silt Fence
- P_RDWY_Slope Drain
- P_RDWY_Sodding
- P_RDWY_Station Equations-Text
- P_RDWY_Station Equations-Text

- P_RDWY_Text-Description
- P_RDWY_Text-Details
- P_RDWY_Text-Dimensions
- P_RDWY_Text-Notes
- P_RDWY_Text-Notes
- P_RDWY_Text-Tables
- P_RDWY_Text-Titles
- P_RDWY_Vegetative Filter Strip
- P_TRAF_Maintenance
- P_TRAF_Maintenance-Barrier Wall
- P_TRAF_Maintenance-Sign
- P_TRAF_Maintenance-Signal
- P_TRAF_Maintenance-Text
- P_TRAF_Pavement Marking Temp-Message
- P_TRAF_Pavement Marking Temp-White
- P_TRAF_Pavement Marking Temp-White Broken
- P_TRAF_Pavement Marking Temp-Yellow
- P_TRAF_Pavement Marking Temp-Yellow Broken
- P_TRAF_Pavement Marking-Crosswalk
- P_TRAF_Pavement Marking-Message
- P_TRAF_Pavement Marking-Stop Line
- P_TRAF_Pavement Marking-Text
- P_TRAF_Pavement Marking-White
- P_TRAF_Pavement Marking-White Broken
- P_TRAF_Pavement Marking-Yellow
- P_TRAF_Pavement Marking-Yellow Broken
- P_TRAF_Pavement Marking-Yellow Double
- P_TRAF_Sign
- P_TRAF_Signal
- P_TRAF_Text
- RW_App Existing PL
- RW_App Existing RW
- RW_Coordinates-Text
- RW_Coordinates-Text
- RW_Description-Text
- RW_Description-Text
- RW_Existing RW
- RW_Section Line-Text
- RW_Section Line-Text
- S_ALG_Alignment-Text
- S_ALG_Ground Profile
- S_ALG_Ground Profile-Text
- S_ALG_Stationing
- S_ALG_Ticks
- XS_TC_Guardrail Left

- o XS_TC_Guardrail Right
- Removed Level
  - o P_RDWY_Right-of-Way

Seed Files

- US Files
  - o Renamed all instances to INDOT_US_Seed.dgn
  - o Set Master Units to Feet and label '
  - o Set Sub Units to Inches and label "
- US Survey Foot Files
  - o Renamed all instances to INDOT_US_SVFT_Seed.dgn
  - o Set Master Units to Survey Feet and label '
  - o Set Sub Units to Survey Inches and label "
- Metric Files
  - o Renamed all instances to INDOT_SI_Seed.dgn

US Drawing Spreadsheets

- All Text Changed to Tahoma

D Size and Ltr size.dgns

- All fonts changed to Tahoma from Arial both True Type and Bentley 141
- Updated border levels to new naming convention

Real Estate Seed Files

- Renamed all seed files to updated unitary conventions (SVFT, US, SI)
- Adjusted unitary labels
  - o Survey Foot (') and Survey Inch (")
  - o Foot (') and Inch (")
  - o Meter (m) and Millimeter (mm)

Survey Seed Files

- Renamed all seed files to updated unitary conventions (SVFT, US, SI)
- Adjusted unitary labels
  - o Survey Foot (') and Survey Inch (")
  - o Foot (') and Inch (")
  - o Meter (m) and Millimeter (mm)

### 1.8-1b    InRoads Resources

INDOT.xin

- All fonts changed to Tahoma from Arial both True Type and Bentley 141
- Adjusted levels to new level naming scheme where needed

- New Preferences per Roadway Services
  - IN RDWY Profile Vert Annotation for use with Geometry -> View Geometry -> Vertical Annotation
  - IN ISD Profile 20 for use with Evaluation -> Profile -> Create Profile
  - IN RDWY RW Annotation for use with Evaluation -> Cross Section – Cross Sections, Annotate Cross Section leaf.
- Updated styles to include Cross Section point symbologies
  - P_RDWY_GR Left
  - P_RDWY_GR Right
  - RW_Existing RW
  - RW_ProposedRW
  - RW_TemporaryRW
- Adjusted Horizontal and Vertical Alignment Styles to use P_ALG_Horizontal and P_ALG_Vertical levels for all alignment elements.

### 1.8-1c      InterPlot Resources

All .set files

- Updated to function with new level naming scheme.

All .pen files

- Adjusted screening of Cross Section Grid elements to 60% screening for increased visibility.

### 1.8-1d      ProjectWise

ProjectWise Explorer

- Updated managed workspace to new resources
- Adjusted working directories to comply with new Windows 7 directory structure.
- Procedural adjustments for use of special characters with MicroStation integration

## 1.8-2    DOTWise 3.2 Change log (Released 3/15/13)

### 1.8-2a      Major New Functionality

New Features

- Inclusion of Survey Route Plat Production process using InRoads and ProjectWise
- Creation of Geocoordinated Seed Files
- ArcGIS and other Geolocated resources in MicroStation

### 1.8-2b      Document Updates

DOTWise

- Chapter 6 added – Using InRoads for Survey/Routeplat Production
- Using InRoads, now named InRoads Plans Production for Design and is now Chapter 7
- Chapter 8 added - Geocoordination and ArcGIS Resources In MicroStation
- Appendix B adjustments to include new recommended MicroStation sheet naming.

### 1.8-2c MicroStation

Scales.def

- Removed all Direct Scales (Ex. 1:10) from the Drawing Scale definition file.
- Added 3/32" = 1' to the Drawing Scales definition file.
- Added 1" = 5' to the Drawing Scales definition file.

IN_Interface.dgnlib

- Updated Survey Task under INDOT Tools to include Cell Selector functionality.
- Fixed the Help Desk link under Help -> INDOT – INFO.

IN_InRoads.cel

- All Cells adjusted for scaling consistency and text size.
- All Cells moved to Default level to allow for automatic level placement unless otherwise used on Title Sheets such as North Arrows, Border Text and Title Block Tags.
- Adjusted any instance of R\W to R/W (Cross Section Cells)
- Removed the following Cells

| | | | |
|---|---|---|---|
| 3DTree | lstab | poo2 | sqrewc |
| arrosy | ltc | poo3 | sscrub |
| battle | ltd | poo4 | STLGHT |
| bearch | marshs | poo5 | STOP |
| benc1 | Model-1 | poo6 | stopva |
| benchm | msl_0 | poo8 | strsli |
| bracke | msl_1 | pooa | strsre |
| bush2 | msl_2 | poob | surfle |
| cavesy | msl_3 | pooc | surstn |
| chapel | msl_4 | pood | synago |
| chase | msl_5 | POOE | tbmsym |
| christ | msl_6 | poof | telebx |
| circho | msl_7 | pooh | textic |
| civlia | msl_8 | pooo | tree |
| clmacr | msl_9 | posier | tree1 |
| conife | msl_10 | pre2 | tree2 |
| CONIFERS | msl_11 | pre3 | tree4 |
| coposi | msl_12 | pre4 | tree5 |
| decidu | msl_13 | pre5 | tree6 |
| downar | msl_14 | pre6 | tree7 |
| dpfico | msl_15 | pre7 | tree8 |
| drain1 | msl_16 | pre8 | tree9 |
| drain2 | mslsym0 | PVTR | tree10 |
| drain3 | mslsym1 | reedss | tree11 |
| drain4 | mslsym2 | rgrass | tree12 |
| drain5 | mslsym3 | rnarro | tree13 |
| dtlsym | mslsym4 | rndecr | treesy |
| elecbo | mslsym5 | rndgcr | triagr |

- elecpo
- elecpy
- elepyl
- errsym
- firehy
- firtre
- garage
- gasval
- gradch
- gully
- heath
- heathla
- honosy
- hostac
- hythe
- hythe2
- hythe3
- iadsy1
- iadsy2
- iadsy3
- IADSYMB1
- lbould
- lconif
- leigh
- lncon
- lpar5
- lscrub
- mslsym6
- mslsym7
- mslsym8
- mslsym9
- mslsym10
- mslsym11
- mslsym12
- mslsym13
- mslsym14
- mslsym15
- mslsym16
- msreed
- mxmacr
- northi
- nyullsy
- orchar
- osbmk
- osrvsn
- ostrgs
- pbrk Stopo
- pip2
- pip3
- pip4
- pip6
- pip8
- pltico
- poo1
- rndicr
- rndmhl
- rndtcr
- rndwcr
- rock
- rohrRu
- romhno
- rowtex
- rughgr
- saltin
- sbould
- sconif
- scrubs
- seatsy
- seedpt
- servic
- smallf
- snconi
- splnkl
- splnkr
- spotle
- sqmhno
- sqreec
- sqregc
- sqreic
- sqremh
- sqretc
- triarr
- trig_p
- trmhno
- uparro
- vertar
- vertsy
- vipsy2
- vipsy3
- vipsy4
- vipsym
- windmi
- wood20
- wtmtr
- xarro
- zerosy
- Added the following Cells
  - BROKENLINE
  - GRAIL
  - NAIL
  - PASP
  - PBOL
  - PBSH
  - PCBR
  - PCBS
  - PCCTE
  - PCCTR
  - PCIN
  - PCLM
  - PCOU
  - PCTY
  - PCWV
  - PDHC
  - PDIN
  - PDNR
  - PDOT
  - PEDF
  - PFHY
  - PGCA
  - PGNW
  - PGSP
  - PGVP
  - PIRP
  - PJPT
  - PLJP
  - PLPP
  - PMBS
  - PMBU
  - PMCT
  - PMDR
  - PMEL
  - PMFO
  - PMGA
  - PMGS
  - PMOT
  - PMSE
  - PMTE
  - PMUS
  - PMWA
  - PNGW
  - PNGWS
  - POHW
  - PPLB
  - PPLE
  - PPVP
  - PRSC
  - PRSE
  - PRST
  - PRSW
  - PRWC
  - PRWG
  - PRWS
  - PSAC
  - PSCA
  - PSGLB
  - PSGRR
  - PSGTN
  - PSNBT
  - PSNC
  - PSNCS
  - PSNDA
  - PSNMT
  - PSNR
  - PSNS
  - PSNSA
  - PSNTC
  - PSPH
  - PSPT
  - PSRC
  - PTBM
  - PTST
  - PWDH
  - PWDS
  - PWMT
  - PWSV
  - PSNBT

- PERT
- PMTS
- PSGTS
- 

IN_Symbols.cel

- Adjusted North Arrow cell

IN_SurveyMonuments.cel

- New library included for use with the Survey Task including Survey monument cells.

IN_ScaleBars.cel

- Added 1" = 300'
- Added 1" = 400'
- Added 1" = 500'
- Added 1" = 600'
- Added 1" = 800'
- Added 1" = 1000'

IN_TablesLegendsNotes.cel

- Removed duplicate and Index cells.

In_TablesLegendsNotesTraffic.cel

- Merged duplicate cells from IN_TablesLegendsNotes.cel

IN_Symbols.cel

- Added TR_Barrel
- Added TR_Tubular Marker

IN_Patterns.cel

- Adjusted scaling of ST_CONC

IN_Symbology.dgnlib

- New levels
  - P_RDWY_Curb Ramp
- Removed levels
  - P_RDWY_Construction Limits
- Renamed levels
  - P_RDWY_Construction Limits Text -> P_RDWY_Constr Limits Text
- Added InRoads – 12 Point Text (Existing Elevations) for use with InRoads Profile creation tools only.
- Updated .dgnlib to include standard INDOT Color Table.

- Justification changes to the following dimension styles:
  - Standards Metric
  - Standards Common
  - Standards English
- Added circular frame to following dimension styles along with setting the appropriate frame scale:
  - Engr Circle Ltr
  - Engr Circle
  - Engr Circle Line Ltr
  - Engr Circle Line
- Renamed SUICIDE linestyle to TWLTL (Two Way Left Turn Lane)

Ltr_sheets.dgn

- Fixed traffic information on title sheet.
- Replaced scaled north arrow on title sheet

D_size_sheets.dgn

- Replaced scaled north arrow on title sheets
- Centered county tag on title sheets

routeplat_SI.dgn, routeplat_US.dgn & routeplat_US_SVFT.dgn

- Updated all files to adhere to current INDOT CAD Standards for leveling and text styles.
- Updated all files for use with the DOTWise managed workspace and ProjectWise workflow.

### 1.8-2d    InterPlot Resources
InterPlot Functionality

- Increased the limit of plot shapes that Iplot will scan for in a DGN to accommodate large sets of Cross Sections
- Changed IPLOT dialog in MicroStation to non-modal to make it function similar to the standard Print/Plot tools.

INDOT Design Script_AN.pen & INDOT Design Script_NN.pen

- Added Profile Grid Screening

### 1.8-2e    InRoads Resources
INDOT.xin

- Adjusted Profile Existing Elevation text style and color
- Adjusted scaling of all North Arrow cells placed by InRoads Plan and Profile Generator
- Adjusted Traffic Markings survey styles
- Adjusted section placement on 5 scale cross sections to allow for proper placement of annotation.

- Corrected IN RDWY Profile Vert Annotation preference for Vertical Annotations
- Adjusted P_RDWY_GR Left & Right to color 200
- Adjusted Profile Grade Annotation to XS_G_Profile Grade Annotation level.
- Removed P_RDWY_Construction Limits and replaced symbology in P_RDWY_Constr Limits
- Change levels for Horizontal Alignment annotation to P_ALG_Stationing and P_ALG_Ticks

INDOT_SI_seed.dgn, INDOT_US_seed.dgn & INDOT_US_SVFT.dgn

- Enabled geocoordination features and adjusted working units to built-in values for geocoordination usage.

### 1.8-2f     ProjectWise

ProjectWise Explorer

- Updated managed workspace to new resources
- Implementation of new Survey folder structure
- Enabled managed workspace blocks used for Survey Geocoordination procedures.

## 1.8-3  DOTWise 3.3 Change log (Released 8/20/2013)

### 1.8-3a     Major New Functionality

New Features

- Design usage of the Geo-coordinated Seed file as provided in the Survey Deliverables
- Traffic and Signals Process Overview

### 1.8-3b     Document Updates

DOTWise

- Version update to DOTWise 3.3
- Chapter 2, Section 11 - Update to special character usage with ProjectWise SS4 client on document interfaces.
- Chapter 4, Section 3 - Revised Digital Signature creation procedure.
- Chapter 7, Section 6-4 - Vertical profile manual cleanup process.
- Chapter 7, Section 9-7- Benching Cut/Volume placement process.
- Chapter 8, Section 3 - Revised procedure for using the GIS Map Insert application.
- Appendices, Section 1.4-9 - Place cell along for MOT Barrels procedure added.
- Entire document - Various screen capture and document updates as required.

### 1.8-3c     MicroStation

IN_Symbology.dgnlib

- Linestyles
  - RPM 40ft - Adjusted pattern size to 1.5 units (down from 3)
  - RPM 80ft - Adjusted pattern size to 1.5 units (down from 3)
  - cl double - Added linestyle
  - MOT Barrels 50 - Revised linestyle symbol

- - MOT Barrels 100 - Revised linestyle symbol
- Levels
  - P_RDWY_Mailbox - Added, color 0, weight 0, linestyle 0
  - P_TRAF_Pavement Marking-RPM40 - Added, color 22, weight 0, linestyle RPM40ft
  - P_TRAF_Pavement Marking-RPM80 - Added, color 22, weight 0, linestyle RPM80ft
  - P_DR_Ditch Line - Added, color 1, weight 1, linestyle dpfl
  - P_TRAF_Line Removal - Added, color 0, weight 0, linestyle befbw
  - RW_Code-Text - Added, color 7, weight 0, linestyle 0
  - P_TRAF_Lighting - Added, color 0, weight 1, linestyle 0
  - E_TRAF_Lighting - Added, color 46, weight 0, linestyle 0
  - E_TRAF_Sign - Added, color 46, weight 0, linestyle 0
  - E_TRAF_Signal - Added, color 46, weight 0, linestyle 0
  - P_BR_Reinforcing Expoxy Coated 2 - Added, color 115, weight 1, linestyle 0
  - P_BR_Reinforcing Expoxy Coated 3 - Added, color 115, weight 1, linestyle 0
  - P_BR_Reinforcing Plain 2 - Added, color 115, weight 1, linestyle 0
  - P_BR_Reinforcing Plain 3 - Added, color 115, weight 1, linestyle 0
  - P_BR_Removal Concrete - Added, color 3, weight 0, linestyle 0
  - P_BR_Removal Steel - Added, color 3, weight 0, linestyle 0
  - BD_PE Stamp - Added, color 0, weight 0, linestyle 0
  - BD_LS Stamp - Added, color 0, weight 0, linestyle 0
  - XS_G_Benching Area - Added, color 44, weight 0, linestyle 0
  - XS_G_Benching Volume- Added, color 44, weight 0, linestyle 0
  - XS_G_Benching Shape - Added, color 44, weight 0, linestyle 0
  - PP_G_Horiz_Align_RadialAnnotation - Added, color 0, weight 1, linestyle 3
  - PP_G_Horiz_Align_TangentAnnotation - Added, color 0, weight 1, linestyle 3
  - BD_SHT_Ref Boxes - Added, color 0, weight 0, linestyle 0
  - P_RDWY_Proposed Ground Line - Added, color 2, weight 1, linestyle 0
  - P_RDWY_Should Reconstruction - Added, color, weight 0, linestyle 0
  - P_BR_Sheet Piling - Added, color 4, weight 2, linestyle 0
  - P_TRAF_Maintenance-Barricade - Added, color 2, weight 1, linestyle 0
  - E_BR_Approach Slab - Added, color 200, weight 0, linestyle 0
  - E_BR_Pier - Added, color 200, weight 0, linestyle 0
  - E_BR_Structural Steel - Added, color 200, weight 0, linestyle 0
  - E_BR_Concrete Box Beam - Added, color 200, weight 0, linestyle 0
  - E_BR_Concrete I-Beam - Added, color 200, weight 0, linestyle 0
  - E_BR_Steel Girder - Added, color 200, weight 0, linestyle 0
  - E_TOPO_Existing Ground Line - Added, color 200, weight 0, linestyle 0
  - RW_ExistingRW-Text - Added, same as non text version
  - RW_ProposedRW-Text - Added, same as non text version
  - RW_TemporaryRW-Text - Added, same as non text version
  - RW_PropertyLine-Text - Added, same as non text version
  - P_S_UTIL_Fiber Optic - Renamed, originally S_UTIL_Fiber Optic Marker
  - P_RDWY_Shoulders Unpaved - Renamed from P_RDWY_Shoulder Unpaved
  - P_TRAF_Pavement Marking-Yellow Double - Changed linestyle to cl double
- Filters

- o Rehab Level Filter - Added with custom level list as managed by INDOT Bridge Rehab
- o E_ Level Filter - Added, filtered based on E_ level prefix
- o Text Level Filter - Added, filtered based on TXT or Text suffixes
- o Traffic Level Filter - Added, filtered based on _TRAF_. E_, P_, and S_ prefixes.
- Dimension Styles
  - o Engr Circle - Changed Frame to None, disabled Frame Scale
  - o Engr Circle Line - Changed Frame to Line, disabled Frame Scale
  - o Engr Circle Line Ltr - Changed Frame to Line, disabled Frame Scale
  - o Engr Circle Ltr - Changed Frame to None, disabled Frame Scale
  - o Standards Common - Enabled Graphics -> Join When Text Outside
  - o Standards English - Enabled Graphics -> Join When Text Outside
  - o Standards Metric  - Enabled Graphics -> Join When Text Outside

## IN_Symbols.cel

- Additions
  - o BR_Fillet Weld
  - o BR_JointTypeA
  - o BR_PipeEnd
  - o RD_TempConcBarrier
  - o RD_MOT Barrel
- Removals
  - o MOT Barrel - replaced by RD_MOT Barrel
  - o Obsolete  LG_ Cells, updated versions available in IN_Lighting.cel

## IN_InRoads.cel

- Modifications
  - o Cross Section Tags - Adjusted font on Sheet name tag to Agency Standard
  - o rowextg - Adjusted abbreviation on symbol from EXTG to Ex.
  - o rowextgm - Adjusted abbreviation on symbol from EXTG to Ex.

## IN_Signals.cel

- Additions
  - o ACCESSBOX
  - o REPEATER
  - o WRLSDETECT
  - o WRLSDETECTX6

## IN_TableslegendsNotesTraffic.cel

- Additions
  - o SG_ACCESSBOX
  - o SG_REPEATER
  - o SG_SENSORF
  - o SG_SENSORT

- LG_BA
- LG_CAMBAR
- LG_CO
- LG_DUCT IN CONDUIT
- LG_DUCT IN TRENCH
- LG_EX BA
- LG_EX C0II
- LG_EX CABMAR
- LG_EX DUCT IN CONDUIT
- LG_EX DUCT IN TRENCH
- LG_EX HH
- LG_EX NBA
- LG_EX NBA400
- LG_EX SVPT I
- LG_EX SVPT II
- LG_HH
- LG_NBA
- LG_SVPT_I
- LG_SVPT II
- LG_T490
- LG_T660
- LG_T4180
- LG_T6180
- LG_TOW4
- LG_TOW6
- LG_UP

- Removals
  - Obsolete LG_ cells
  - Obsolete SN_ cells
- Modifications
  - All pre-existing SG_ cells
  - Existing SN_ cells renamed using SG_ prefix.

IN_Lighting.cel

- Additions
  - LG_BA
  - LG_EXBA
  - LG_EXLUMIN
  - LG_EXNB
  - LG_EXCABMAR
  - LG_EXHH
  - LG_EXSVPT I
  - LG_EXSVPT II
  - LG_HH

- LG_LUMIN
  - LG_LUMINID
  - LG_SVPT_I
  - LG_SVPT II
  - LG_T40
  - LG_T60
  - LG_T490
  - LG_UP
  - LG_T6180
  - LG_T6360
  - LG_EXT40
  - LG_EXT60
  - LG_EXT490
  - LG_EXT4180
  - LG_EXT6180
  - LG_EXT6360
  - LG_EXUP
- Removals
  - Obsolete LG_ cells

## IN_PE-LS-Stamps.cel

- Modifications
  - All PE stamps moved to BD_PE Stamp level
  - All LS stamps moved to BD_LS Stamp level

## IN_Signs.cel

- All signs cells updated, obsolete SN_ cells removed.

## Ltr_sheets.dgn

- Adjusted margining and formatting for standard presentation and usage in the following models
  - Ltr. Detour Sheet Signing
  - Ltr. Strip Map Sheet
  - Ltr. Detail
  - Ltr. Landscape Detail
  - Ltr. Title Sheet

## D_size_sheets.dgn

- Added date/time plot information to all sheets, included $FILE$ tag where missing.
- Additions
  - SG_Detail Sheet - Copy of RD_Detail Sheet with adjusted text boxes as placeholders in sheet title block.  Added sample text outside of plot area.  Added text for

Commission number (must be this size and font).  Did not use tags for County and District text since they will not necessarily be the same throughout the project.

- Removals
  - SG_Detail Sheet EIT, replaced by SG_Detail Sheet
  - SG_Detail Sheet PE, replaced by SG_Detail Sheet
- Modifications
  - RD_Soil Boring Sheet - Renamed to BR_Soil Boring Sheet
  - BR_Quantities Sheet - Renamed to BR_Summary Sheet, Title Block Updated
  - RD_Summary Sheet - Title Block Updated
  - SN_Index Sheet - Deleted details for Square Post for Sheet Sign and Route Marker Posts Assembly.  Deleted sample notes from General Notes and replaced with text placeholder, similar to RD_Index Sheet
  - All Title Sheets
    - Tables have been aligned for a consistent look in a single sheet and across all sheets.  In some cases, they were resized slightly.
    - Template text box added for Project Description.
    - North Arrow starting location standardized.
    - No changes to tags, other than to remove $BRIDGE_FILE$ from RD_Title Sheet ROW.
  - SG_Title Sheet - Added text and tags for Latitude and Longitude below county location map.
  - SL_Title Sheet - Added text and tags for Latitude and Longitude below county location map.  Deleted block for Traffic Data and Design Data.
  - BR_Title Sheet
    - R/W Code changed to Land Acq. Code
    - Text for Land Acq. Code and Des. No. relocated slightly lower (spacing issue)
    - Remove text for P.E. project no. and Const. project no., rather than print and strikethrough
    - Provide table and text placeholders for Structure Information and location description on BR_Title Sheet ROW
    - Adjust and align boxes/frames for cleaner appearance
    - Structure Information table standardized with template text boxes added and located in upper lefthand corner of sheet.
  - BR_Title Sheet ROW
    - Structure Information table standardized with template text boxes added and located in upper lefthand corner of sheet.
  - BR_Title Sheet Rehab
    - Structure Information table standardized with template text boxes added and located in upper lefthand corner of sheet.
  - RD_Title Sheet
    - R/W Code changed to Land Acq. Code
    - Text for Land Acq. Code and Des. No. relocated slightly lower (spacing issue)
    - Remove text for P.E. project no. and Const. project no., rather than print and strikethrough

- Provide table and text placeholders for Structure Information and location description on BR_Title Sheet ROW
- Adjust and align boxes/frames for cleaner appearance
- Project data reformatted into table form and moved to righthand side of sheet beneath latitude/longitude table.
  - RD_Title Sheet ROW
    - Project data reformatted into table form and moved to righthand side of sheet beneath latitude/longitude table.

routeplat_SI.dgn, routeplat_US.dgn, routeplat_US_SVFT.dgn

- Added date/time plot information.  Revised and added $FILE$ tag where missing.

### 1.8-3d    InterPlot Resources
INDOT Design Script_AN.pen and INDOT Design Script_NN.pen

- Added date/time plot time text replacement script

INDOT Pen Table Color.tbl

- Added for color plot sets.

InterPlot Organizer Client

- Upgraded to SS4 version.

### 1.8-3e    InRoads Resources
INDOT.xin

- Imported InRoads rule set for Aerial Engineering Level Standard updates.
- Additions
  - Preference - IN_CorridorSurface for Roadway Designer -> Create Surface tool
  - P_ALG_Stationing Major named symbology
  - P_ALG_Stationing Eq named symbology
  - P_ALG_Stationing PI named symbology
- Removals
  - Removed Grade prefix on all IN Vertical Annotation Preferences
  - Removed PVC, PVT, Curve Type, and K vale from all IN Vertical Annotation Preferences.
- Modifications
  - Replaced Length prefixes with VC on all IN Vertical Annotation preferences.
  - Disabled Radials on all IN Horizontal Annotation preferences.
  - PP_G_Horiz_Align_RadialAnno - Adjusted text and line symbology to use level PP_G_Horiz_Align_RadialAnnotation
  - PP_G_Horiz_Align_TangentAnno - Adjusted text and line symbology to use level PP_G_Horiz_Align_TangentAnnotation

- P_RDWY_Shoulders Unpaved - Renamed from P_RDWY_Shoulder Unpaved, both style and named symbology
- IN_PG_Annotation - Adjusted Xsec Annotation offset and rotation.
- Survey Options - Changed angular unit readout to 2 decimal places accuracy.
- XS_G_Grid Elevations - Adjusted default text symbology to 12 point.
- XS_G_Grid Offsets - Adjusted default text symbology to 12 point.
- IN PG Annotation - Adjusted default text symbology to 12 point.
- RW_TemporaryRW - Adjusted cross section symbology to use cell rowtemp

INDOT_CrossSectionBorder.dgn

- Removed rogue linear element.

### *1.8-3f      ProjectWise Updates*

ProjectWise Explorer Client

- Client Version updated to SS4
- ArcGIS 10.1 Compatibility

DOTWise Environment

- All disciplines now have project types, environments and workflows.  Where necessary, placeholder information has been inserted to allow for future expansion.
- DOTWise Project Creator updated to increase usability and accommodate new project creation types.

## 1.8-4   DOTWise 3.4 Change log (Released 3/21/14)

### *1.8-4a      Major New Functionality*
- Complete standardization of all InRoads Drainage features to INDOT Standard Naming and leveling conventions.

### *1.8-4b      Document Updates*
- Added section 2.16 on LEAP Bridge ProjectWise integration
- Updated section 4.3 Digital Signatures to accommodate Adobe Acrobat Pro XI
- Chapter 8 Geo-Coordination and ArcGIS Resources in MicroStation/InRoads is now Chapter 9
- Chapter 8 MicroStation Plans Production added and includes:
  - Resurface Plans procedures
- Appendix G changed to Appendix H
- Appendix G added with Reference Documentation/Web Information Links

### *1.8-4c      MicroStation*
IN_Interface.dgnlib

- Replaced TextUtil based Change Case tool with Native MicroStation tool

IN_Symbology.dgnlib

- Levels
  - P_PVMT_HMA Surface- Added, color 0, weight 1, linestyle 0
  - P_PVMT_HMA Intermediate- Added, color 1, weight 0, linestyle 0
  - P_PVMT_HMA Base- Added, color 0, weight 1, linestyle 0
  - P_PVMT_PCCP- Added, color 0, weight 1, linestyle 0
  - P_PVMT_Agg Base- Added, color 0, weight 1, linestyle 0
  - P_PVMT_Shoulder- Added, color 0, weight 1, linestyle 0
  - E_PVMT_PCCP- Added, color 0, weight 0, linestyle existing
  - E_PVMT_HMA- Added, color 0, weight 0, linestyle existing
  - P_RDWY_Text-Legend-Added, color 0, weight 0, linestyle 0
  - P_BR_Text-Legend-Added, color 0, weight 0, linestyle 0
  - RW_Text-Legend-Added, color 0, weight 0, linestyle 0
  - S_TOPO_Wall-Added, color 200, weight 0, linestyle 0
  - E_DR_Catchpit-Added, color 1, weight 0, linestyle 0
  - E_DR_Combo-Added, color 1, weight 0, linestyle 0
  - E_DR_Culvert-Added, color 1, weight 0, linestyle 0
  - E_DR_Culvert - Text-Added, color 1, weight 0, linestyle 0
  - E_DR_CulvertInside-Added, color 1, weight 0, linestyle 0
  - E_DR_CulvertOutside-Added, color 1, weight 0, linestyle 0
  - E_DR_CurbGrate-Added, color 1, weight 0, linestyle 0
  - E_DR_CurbOpening-Added, color 1, weight 0, linestyle 0
  - E_DR_DitchBottom-Added, color 1, weight 0, linestyle 0
  - E_DR_Manhole-Added, color 1, weight 0, linestyle 0
  - E_DR_Manhole - Text-Added, color 1, weight 0, linestyle 0
  - E_DR_Median-Added, color 1, weight 0, linestyle 0
  - E_DR_MedianDrop-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_CMP-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_CMP-Inside-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_CMP-Outside-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_Concrete-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_Concrete-Inside-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_Concrete-Outside-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_PVC-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_PVC-Inside-Added, color 1, weight 0, linestyle 0
  - E_DR_Pipe_PVC-Outside-Added, color 1, weight 0, linestyle 0
  - E_DR_Vault-Inside-Added, color 1, weight 0, linestyle 0
  - E_DR_Vault-Outside-Added, color 1, weight 0, linestyle 0
  - P_DR_Area-Added, color 1, weight 0, linestyle 0
  - P_DR_Area - Text-Added, color 1, weight 0, linestyle 0
  - P_DR_Catchpit-Added, color 1, weight 0, linestyle 0
  - P_DR_Channel-Added, color 1, weight 0, linestyle 0
  - P_DR_Channel - Text-Added, color 1, weight 0, linestyle 0
  - P_DR_Channel Bottom Width-Added, color 1, weight 0, linestyle 0
  - P_DR_Channel Center-Added, color 1, weight 0, linestyle 0
  - P_DR_Combo-Added, color 1, weight 0, linestyle 0

- P_DR_Culvert-Added, color 1, weight 0, linestyle 0
- P_DR_Culvert - Text-Added, color 1, weight 0, linestyle 0
- P_DR_Culvert Center-Added, color 1, weight 0, linestyle 0
- P_DR_CulvertInside-Added, color 1, weight 0, linestyle 0
- P_DR_CulvertOutside-Added, color 1, weight 0, linestyle 0
- P_DR_CurbGrate-Added, color 1, weight 0, linestyle 0
- P_DR_CurbOpening-Added, color 1, weight 0, linestyle 0
- P_DR_DitchBottom-Added, color 1, weight 0, linestyle 0
- P_DR_DitchBottomOutside-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet - Text-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet Catchpit-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet Combination-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet Curb Opening-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet Grate-Added, color 1, weight 0, linestyle 0
- P_DR_Inlet Median Drop-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole - Text-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole Box-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole Circular-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole Cone-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Manhole Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Median-Added, color 1, weight 0, linestyle 0
- P_DR_MedianDrop-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe - Text-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe Center-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_CMP-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_CMP-Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_CMP-Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_Concrete-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_Concrete-Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_Concrete-Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_PVC-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_PVC-Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Pipe_PVC-Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Pumps-Added, color 1, weight 0, linestyle 0
- P_DR_Pumps Inside-Added, color 1, weight 0, linestyle 0
- P_DR_Pumps Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Utility-Added, color 1, weight 0, linestyle 0
- P_DR_Utility - Text-Added, color 1, weight 0, linestyle 0
- P_DR_Vault-Inside-Added, color 1, weight 0, linestyle 0

- P_DR_Vault-Outside-Added, color 1, weight 0, linestyle 0
- P_DR_Zone-Added, color 1, weight 0, linestyle 0
- P_DR_Zone - Text-Added, color 1, weight 0, linestyle 0
- P_TRAF_Detour Ex Road-Added, color 3, weight 2, linestyle 0
- P_TRAF_Detour Text-Added, color 0, weight 1, linestyle 0
- P_TRAF_Detour Town-Added, color 2, weight 1, linestyle 0
- E_TRAF_Pavement Marking-Crosswalk-Added, color 64, weight 1, linestyle crosswalk
- E_TRAF_Pavement Marking-Message-Added, color 64, weight 1, linestyle 0
- E_TRAF_Pavement Marking-Stop Line-Added, color 64, weight 1, linestyle stop line
- E_TRAF_Pavement Marking-Text-Added, color 0, weight 1, linestyle 0
- E_TRAF_Pavement Marking-White-Added, color 64, weight 1, linestyle 0
- E_TRAF_Pavement Marking-White Broken-Added, color 64, weight 1, linestyle skips
- E_TRAF_Pavement Marking-Yellow-Added, color 84, weight 1, linestyle 0
- E_TRAF_Pavement Marking-Yellow Broken-Added, color 84, weight 1, linestyle skips
- E_TRAF_Pavement Marking-Yellow Double-Added, color 84, weight 1, linestyle cl double
- E_TRAF_Pavement Marking-Added, color 46, weight 0, linestyle 0

## IN_InRoads.cel

- Additions
  - PISL Cell for use with new PISL code

## Ltr_sheets.dgn

- Changes to Title Sheet model consistent with IDM
  - Added Access Control and its tag to the Design Data block
  - Relocated the truck %DHV consistent with location on full size plans
  - Added the date line for the Approved for Letting signature

### 1.8-4d    InRoads Resources

## INDOT.xin

- Project Options
  - Default value of Elevation Precision set to 3 places (.123) from 2 places (.12).
- Drainage –
  - All features defined with INDOT Standard names as listed in the Additions section
  - Default preferences define with INDOT Features for Drainage -> View -> Drainage
- Additions
  - S_TOPO_Wall-Survey and Surface Feature, color 200, weight 0, linestyle 0.  Coded as WALL.
  - S_TRAF_Loop Detector-Survey and Surface Feature, point symbol for PISL cell, coded as PISL
  - E_DR_Catchpit-Surface feature, color 1, weight 0, linestyle 0
  - E_DR_Combo-Surface feature, color 1, weight 0, linestyle 0

- o E_DR_Culvert-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Culvert - Text-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_CulvertInside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_CulvertOutside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_CurbGrate-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_CurbOpening-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_DitchBottom-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Manhole-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Manhole - Text-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Median-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_MedianDrop-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_CMP-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_CMP-Inside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_CMP-Outside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_Concrete-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_Concrete-Inside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_Concrete-Outside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_PVC-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_PVC-Inside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Pipe_PVC-Outside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Vault-Inside-Surface feature, color 1, weight 0, linestyle 0
- o E_DR_Vault-Outside-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Area-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Area - Text-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Catchpit-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Channel-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Channel - Text-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Channel Bottom Width-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Channel Center-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Combo-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Culvert-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Culvert - Text-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Culvert Center-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_CulvertInside-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_CulvertOutside-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_CurbGrate-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_CurbOpening-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_DitchBottom-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_DitchBottomOutside-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet - Text-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet Catchpit-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet Combination-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet Curb Opening-Surface feature, color 1, weight 0, linestyle 0
- o P_DR_Inlet Grate-Surface feature, color 1, weight 0, linestyle 0

- - P_DR_Inlet Median Drop-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole - Text-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole Box-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole Circular-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole Cone-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Manhole Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Median-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_MedianDrop-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe - Text-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe Center-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_CMP-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_CMP-Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_CMP-Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_Concrete-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_Concrete-Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_Concrete-Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_PVC-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_PVC-Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pipe_PVC-Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pumps-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pumps Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Pumps Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Utility-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Utility - Text-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Vault-Inside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Vault-Outside-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Zone-Surface feature, color 1, weight 0, linestyle 0
  - P_DR_Zone - Text-Surface feature, color 1, weight 0, linestyle 0
- Removals
  - Removed Survey Codes (definitions for surface features still exist and will continue to exist for the foreseeable future).
    - AA
    - AI
    - AS
    - BND
    - CE
    - CO
    - CS
    - CR
    - DC

- DF
- DP
- EL
- EM
- ET
- IS
- OB
- OC
- OD
- OH
- OM
- PSWP
- SG
- SW
- TA
- TC
- TD
- TH
- WB
- WW

- Modifications
  - Adjusted P_EW_Ditch Back Named Symbology, Default Line weight from 5 to 1.

IN_InRoads Drainage Structures Imperial.dat

- Modified default Imperial draining structures with INDOT standard naming.

IN_InRoads Drainage Structures Metric.dat

- Modified default Imperial draining structures with INDOT standard naming.

### 1.8-4e    ProjectWise Updates

- All following property and metadata enhancements to accommodate future ProjectWise to ERMS connectivity.
- New document metadata field for all Documents/Environments.
  - UCM_LAST_SENT
  - UCM_LAST_DATE
  - UCM_LAST_USER
- New document metadata for Plans_Production Documents/Environments.
  - UCM_DOCTYPE
- New DESIGN Project Properties
  - Design Type
  - Road Bridge Indicator
  - Managed By
  - Designed By
- Updated all clients to 08.11.11.579 for compatibility with ArcGIS 10.2.

### *1.8-4f    InterPlot Resources*

INDOT Design Script_AN.pen and INDOT Design Script_NN.pen

- Added E_ levels to screened printing with S_ levels.

### *1.8-4g    Spreadsheet Resources*

- Partial 3R Quantities.xls
    - Added, tables included for use with update resurface plan procedures.

## 1.8-5   DOTWise 3.5 Change log (Released 9/19/14)

### *1.8-5a    Major New Functionality*

- Real Estate and CAD/InRoads procedures

### *1.8-5b    Document Updates*

- Added Section 6.5 InRoads XIN Code Report
- Added Chapter 8, Using InRoads for Real Estate
- Previous chapter 8 and 9 are now chapters 9 and 10 respectively
- Renamed Chapter 10 to ArcGIS and CAD, and Geocoordination

IN_Symbology.dgnlib

- Level Additions
    - S_UTIL_Ug-Fiber Optic –color 6, weight 0, linestyle ufibopt
    - PP_G_GIS Annotation –color 0, weight 0, linestyle 0
- Text Style Additions
    - GIS Annotation – Full Size, same as 30pt Text, sized to 30 master units.
- Dimension Style Addition
    - GIS Notation – Based on Engr Arrow, with GIS Annotation – Full Size as Text Style

IN_Interface.dgnlib

- Element Template Additions
    - Annotation Text\GIS Annotation\Alignment Label (Level P_ALG_Horizontal – Text, Dimension Style GIS Notation)
    - Annotation Text\GIS Annotation\Structure Label (Level P_DR_Culvert, Dimension Style GIS Notation)
- Tool Additions
    - INDOT Tools\Annotation Text\GIS Annotation\Place Alignment Label (Uses Alignment Label Element Template, starts Place Text Along tool)
    - INDOT Tools\Annotation Text\GIS Annotation\Place Structure Label (Uses Structure Label Element Template, starts Place Note tool)

The following have all had point of resolution adjustments to more accurately conform with working units.

- INDOT_US_seed.dgn (Bentley Map)

- o INDOT_SI_seed.dgn (InRoads)
- o INDOT_US_seed.dgn (InRoads)
- o INDOT_US_SVFT_seed.dgn (InRoads)
- o INDOT_SI_seed.dgn (MicroStation)
- o INDOT_US_seed.dgn (MicroStation)
- o INDOT_US_SVFT_seed.dgn (MicroStation)
- o INDOT_SI_2Dseed.dgn (Real Estate)
- o INDOT_US_2Dseed.dgn (Real Estate)
- o INDOT_US_SVFT_2Dseed.dgn (Real Estate)
- o Parcel_Plat_Templates.dgn (Real Estate)
- o routeplat_SI.dgn (Survey)
- o routeplat_US.dgn (Survey)
- o routeplat_US_SVFT.dgn (Survey)
- o Ltr_sheets.dgn
- o D size_sheets.dgn

### 1.8-5c     InRoads

INDOT.xin

- Survey Coding
  - o Reinstated the following codes:
    - AA - S_RDWY_Asphalt-approach
    - AI - S_RDWY_Asphalt-island
    - AS - S_RDWY_Asphalt-slab
    - CE - S_DR_Edge of gutter line
    - CO - S_RDWY_Median cross over
    - CS - S_TOPO_Conc slab
    - DC - S_RDWY_Drive-commercial
    - DF - S_RDWY_Drive-field
    - DP - S_RDWY_Drive-private
    - EM - S_RDWY_Mail box approach
    - ET - S_UTIL_Elec transformer box
    - OH - S_PROP_Bldg-overhang
    - SG - S_PROP_Sign-commercial
    - SW - S_TOPO_Stone wall
    - SD - S_TRAF_Sig loop detector
    - TA - S_PROP_Turn apron
    - TC - S_TOPO_Row of trees-coniferous
    - TD - S_TOPO_Row of trees-deciduous
    - WW - S_BR_Wingwall

## 1.8-6   DOTWise 3.5.1 Change log (Released 3/20/15)

### 1.8-6a     Major New Functionality

- Projectwise to UCM
  - o Procedures for sending individual documents into ERMS

- o   Procedures for sending project archives to ERMS
- Documented full Traffic Plans Development process

### 1.8-6b      Documentation Updates

- Added Section 2.18 Exporting Documents to ERMS
- Added Section 4.3 InterPlot Search Area Commands
- Added Section 9.2 Traffic/Signals Plans Production

## 1.8-7   DOTWise 3.5.2 Change log (Released 9/18/15)

### 1.8-7a      Major New Functionality

- Projectwise to UCM has been implemented for Design and is in production.

### 1.8-7b      ProjectWise

- View Additions
    - o   The following views all contain File, Description, File Name, State, ERMS Document Type (UCM_DOCTYPE), Document Last Sent By (UCM_LAST_USER), Document Last Sent On (UCM_LAST_DATE), State of Document When Sent (UCM_LAST_SENT).  This is to aid in clarity when using the ProjectWise to UCM (ERMS) tools.
        - Auditing - ERMS Upload Document Status
        - Construction - ERMS Upload Document Status
        - Consultant - ERMS Upload Document Status
        - Consultant Selection - ERMS Upload Document Status
        - Contracts and Letting - ERMS Upload Document Status
        - Corridor Development - ERMS Upload Document Status
        - Design - ERMS Upload Document Status
        - Environmental Services - ERMS Upload Document Status
        - Finance - ERMS Upload Document Status
        - Geotechnical - ERMS Upload Document Status
        - Hydraulics - ERMS Upload Document Status
        - Multimodal Rail - ERMS Upload Document Status
        - Pavement Design - ERMS Upload Document Status
        - Project Management - ERMS Upload Document Status
        - Project Management Local - ERMS Upload Document Status
        - Project Management State - ERMS Upload Document Status
        - Project Programming - ERMS Upload Document Status
        - RailRoads - ERMS Upload Document Status
        - Real Estate - ERMS Upload Document Status
        - Review - ERMS Upload Document Status
        - Survey - ERMS Upload Document Status
        - Traffic Safety - ERMS Upload Document Status
        - Utilities - ERMS Upload Document Status

### 1.8-7c  MicroStation

IN_Symbology.dgnlib

- Level Additions
    - P_DR_Structure Profile Right–Text (color 3, weight 0, style 0)
    - P_DR_Structure Profile Left–Text (color 3, weight 0, style 0)
    - E_BR_Bridge (color 0, weight 0, style 0)
    - E_BR_Text-Description (color 0, weight 0, style 0)
    - E_BR_Text-Dimension (color 0, weight 0, style 0)
    - E_BR_Text-Legend (color 0, weight 0, style 0)
    - E_BR_Text-Notes (color 0, weight 0, style 0)
    - E_BR_Text-Title (color 0, weight 0, style 0)
- Level Modifications
    - All levels with txt or – Text suffixes have been standardized to –Text.

IN_Interface.dgnlib

- Element Template Level Modifications (Both English and Metric)
    - PI Monument – Now on P_RDWY_Text-Details
    - POT/POC Monument – Now on P_RDWY_Text-Details
    - Pipes (profile View) Left – Now on P_DR_Structure Profile Left–Text
    - Pipes (profile View) Right – Now on P_DR_Structure Profile Right–Text
    - Section Monument – Now on P_RDWY_Text-Details
    - Station Equations (Existing) - Removed

INDOT.xin

- Styles and Named Symbologies
    - All styles and named symbologies with txt or – Text suffixes have been standardized to –Text.

IN_DetailsEng.cel

- Added the following cells
    - TR_Temp conc barrier front
    - TR_Temp concrete barrier side
    - TR_Temp concrete barrier top